Medical Lib.

This Issue Exceeds 91,500 Copies

THE JOURNAL

OF THE

American Medical Association

Subscription, $7.00 | PUBLISHED WEEKLY | Single Copies, 25 Cents

VOLUME 97, No. 17 | 535 North Dearborn Street, CHICAGO, ILL. | OCTOBER 24, 1931

CONTENTS AND SUBJECT INDEX

Endocrine Activity of the Ovary. Edgar Allen, Ph.D., Columbia, Mo. 1189
Discussed by Drs. Pratt, Novak and Allen.

Tissue Resistance and Immunity. Frederick P. Gay, M.D., New York 1193

Immunity in Virus Diseases. W. Lloyd Aycock, M.D., Boston..1199

Principles of Diagnosis and Treatment of Allergic Diseases. Arthur F. Coca, M.D., New York.....1201

The Rôle of Humoral Elements in Immunity. John A. Kolmer, M.D., Philadelphia 1203
Papers of Drs. Gay, Aycock, Coca and Kolmer discussed by Dr. Sulzberger.

Plastic Operation to Restore Voluntary Anal Control. Harvey B. Stone, M.D., Baltimore.....1205

Anal Fistulectomy. Louis A. Buie, M.D., Rochester, Minn. 1208
Papers of Drs. Stone and Buie discussed by Drs. Grove, Fansler, Rosser, Yeomans, Martin, Stone and Buie.

The Differentiation of Peripheral Arterial Spasm and Occlusion in Ambulatory Patients. W. J. Merle Scott, M.D., and John J. Morton, M.D., Rochester, N. Y. 1212

Pathologic Conditions Secondary to Achlorhydria. Elmer L. Eggleston, M.D., Battle Creek, Mich.....1216
Discussed by Drs. Heath, Crohn, Rafsky, Ivy, Rehfuss and Eggleston.

Prostatic Obstruction: Electrocardiographic Study of Three Hundred and Twenty-One Cases: A Further Report. Charles M. Bacon, M.D.; Herman L. Kretschmer, M.D., Chicago, and Lewis W. Woodruff, M.D., Joliet, Ill....1221
Discussed by Dr. Bishop.

The Treatment of Poliomyelitis. John Ruhräh, M.D., Baltimore.1224

CLINICAL NOTES, SUGGESTIONS AND NEW INSTRUMENTS

Benzoyl Peroxide—An Apology. Paul D. Lamson, M.D., Nashville, Tenn. 1225

COUNCIL ON PHARMACY AND CHEMISTRY 1226

COMMITTEE ON FOODS 1227

EDITORIALS

The Physician as Writer, Lecturer and Publicist.....1228

Is Vitamin A Anti-Infective?..1229

Safe Products for Parenteral Administration 1230

CURRENT COMMENT

The Absorption of Levulose....1230

Serum Sickness in Rabbits.....1231

(Subject Index on next page)

ASSOCIATION NEWS 1231

Entered as Second-Class Matter, June 25, 1885, at the Postoffice at Chicago, Ill., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of Oct. 3, 1917, authorized on June 14, 1918. If undeliverable, forwarding and return postage is guaranteed.

Copyright, 1931, by the American Medical Association.

NEXT ANNUAL SESSION, NEW ORLEANS, LA., May 9-13, 1932

Again revised—enlarged—reset!

Todd & Sanford's Clinical Diagnosis

The *new (7th) edition* of this successful book reflects all the many important advances in clinical pathology. All new clinical diagnostic tests and procedures are here detailed, as well as, of course, the standard methods. There are 500 illustrations on 303 figures, 51 of them in colors. The new additions include:

- Corper and Uyei's method for culture of bacteria of tuberculosis
- Fairhall's method for determination of lead
- Folin's 1929 method for precipitation of protein from blood and body fluids
- Folin's modified method for determining uric acid in blood
- Folin's revised copper solution for determination of blood sugar
- Clark and Collip's method for determination of calcium
- Keith, Rowntree, and Geraghty method of determining blood and plasma volume
- The alcohol meal
- Gastric reaction to histamine
- The Gregersen test for occult blood
- Aschheim-Zondek test for pregnancy, with a simple modification
- Agglutination test in the diagnosis of undulant fever and tularemia
- A general and thorough revision of every line of the text
- The addition of many illustrations and replacement of others

Octavo of 765 pages, with 500 illustrations on 303 figures, 51 in colors. By James Campbell Todd, M.D., and Arthur H. Sanford, M.D., Professor of Clinical Pathology, University of Minnesota (The Mayo Foundation). Cloth, $6.00 net

Another Important SAUNDERS BOOK on Page 3

SUBJECT INDEX TO THIS ISSUE

The letters used to explain in which department the matter indexed appears are as follows: The Star (*) indicates an Original Article; "ab," abstract; "E," Editorial; "C," Correspondence; "Ml," Medicolegal; "ME," Medical Economics.

Abscess, ischiorectal, anal fistulectomy....*1208
Achylia gastrica *1216
Acker, James M., forger impersonates.....1233
Acromegaly, anterior lobe of hypophysis.ab-1261
Adhesions, freeing, by pneumolysis.....ab-1254
Albuminuria complicating pregnancy...ab-1259
Allergic diseases, diagnosis and treatment.*1201
Altitudes, oxygen in mountain climbing....1236
increased, and heart disease.....1246
Amenorrhea, theelin in ab-1192
American Board of Obstetrics and Gynecology examinations 1234
Anemia, achlorhydria in *1217
pernicious, liver extract intravenously E-1230; ab-1264
Anesthesia, choice in prostatic obstruction.*1221
effect on blood sugar.....ab-1257
Antibodies formation *1197
source and production *1203
viricidal, indicates exposure to virus....*1199
Antigens, relation to humoral immunity..*1203
Anus fistulectomy *1208
plastic operation to restore voluntary control *1205
Appendicitis, dehydration and anuria...C-1245
Appendix, degenerative lesions.....ab-1253
poisoning ab-1259
Army, sanitary evacuations of.....1240
School of Nursing suspended.....1235
wounded and sick in the field.....1240
Arrhythmia: quinidine intravenously..ab-1260
Arteries spasm, peripheral, and occlusion, differentiation *1212
Arteriosclerosis in prostatic obstruction..*1221
Arthritis, achlorhydria as etiologic factor.*1218
Association News 1231
Asthma, diagnosis; treatment.....*1201
Automobile fatalities, 4 weeks of.....1234
Aviation service, training physician for....1241
Benzoyl peroxide, inflammability and explosibility *1225
Book Notices 1248
Books Received.....Adv. page 34
Breast, diathermy in mastitis.....ab-1260
British Association for the Advancement of Science 1235
Brown Orthopedic Research Fellowships awarded 1233
Bureau of Investigation.....1243
Calcium salts, injected into tissue adjacent to fractures ab-1261
Campbell, James L., honored.....1231
Cancer control, organization for, Berlin..1238
state campaign against, Montana.....1233
Cannon, Walter B., honored.....1233
Cardiovascular Disease, increase 1239
Carlson, A. J., gives Belfield Lecture.....1232
Castration, changes in liver following..ab-1262
Central Association of Obstetricians and Gynecologists 1235
Chemicals, neurotropism of.....ab-1261
Clasmatocytes *1194
Committee on Foods.....1227
Corpus Luteum hormones.....*1190; ab-1257; ab-1262
Correspondence 1244
Council on Medical Education.....1247
Council on Pharmacy and Chemistry.....1226
Damages: settlement based on physician's mistake Ml-1252
Deaths 1241
Dehydration and anuria C-1245
Dentistry: corporations; practice by unlawful Ml-1251
Dermatitis, contact *1201
Diabetes Mellitus and pregnancy.....ab-1256
absorption of levulose.....E-1230
Diarrhea, achlorhydria as a cause.....*1218
Diathermy, hepatic hemostasis ab-1261
in inflammation of pelvic region and mammary glands ab-1260
Diphtheria, immunity in virus diseases..*1199
Drought area, sanitation program in.....1232
Duodenum, obstruction, fatal.....ab-1257
Dyes, bacterial, glycerin as adjuvant to..ab-1253
Ear, internal, fracture into.....1246
Eczema, diagnosis and treatment.....*1201
Endocrine activity of the ovary.....*1189
Endometrium, etiology of hyperplasia....ab-1257
Endothelium *1194
Epinephrine sensitive to alkalis.....1247
Erythrocytes and sympathectomy.....ab-1261
'panagglutinable' C-1245
Estrin hormone ab-1257
Ethics, physician as writer, lecturer and publicist E-1228
Evidence: demonstrative; fragments of fractured skull Ml-1252
Evolution, mechanism of 1236
Exophthalmos, thyroidectomy for ab-1258
Fallopian Tubes, metrosalpingography..ab-1264
Faraday centenary 1236
Fatigue, chronic, in achlorhydria.....*1218
Fertility and intelligence.....1236
Fistula, anal fistulectomy.....*1208
Foot, differentiation of peripheral arterial spasm and occlusion in.....*1212
Foreign Letters 1235
Fracture into internal ear.....1246
calcium salts injected into tissues adjacent to ab-1261
Frauenthal Travel Scholarship awarded....1233
Gallbladder disease and achlorhydria.....*1218
strawberry ab-1262
Gas warfare anticipated: Faraday's views..1236
Glasses, "save your natural eyesight" movement 1238
Glycerin as adjuvant to bacterial dyes...ab-1253
Goiter, pathogenesis ab-1253
thyroidectomy for ab-1258
Gonorrhea, use of metaphen.....1245
Government Services 1235
Growth and anterior lobe of hypophysis.ab-1261
Harvard University, lectures at.....1232
Hay-Fever, diagnosis; treatment.....*1201
Health service and international law.....1241
Heart disease following blow over sternum.1245
disease, increased altitude and.....1246
disease with prostatic obstruction.....*1221
inflammation, climate and rest for.....1246
resuscitating, by injections into cavities.1239
Hemostatic, hepatic ab-1261
Hernia, femoral, treatment ab-1264
intra-abdominal ab-1257
Hospitals, cancer, Berlin.....1238
Humor elements, rôle in immunity.....*1203
Hygiene, public, of villages.....1239
Ileum, obstruction, fatal.....ab-1257
Immunity in virus diseases.....*1199
rôle of humoral elements in.....*1203
tissue resistance and.....*1193
Infection, vitamin A anti-infective agent?..E-1229
Infectious Diseases, immunity in.....*1199
Injections, safe products for.....E-1230
Insulin and preservative.....ab-1259
for symptoms after sudden withdrawal of morphine ab-1260
Insurance, social 1237; 1239
Intelligence and fertility 1236
International Bibliographic Bureau of Military Medicine 1240
College of Anesthetists.....1234
Congress on Medicinal Plants.....1237
Medical Association, congress of.....1239
Intestines, anomalies of rotation.....ab-1257
infections, prophylaxis in the army.....1240
Intussusception, chronic ileocolic.....ab-1264
Iodine metabolism, corpus luteum hormone modifies ab-1262
Kidney functioning in acute nephritis..ab-1264
Kindred, John C., diploma and licenses lost.1233
Larynx tuberculosis, roentgen diagnosis.ab-1263
Levulose, absorption of.....E-1230
Libido and oophorectomy.....1246
Liver, hemostasis ab-1261
changes after castration.....ab-1262
Lungs, massive atelectasis.....ab-1255
mechanism of inflation ab-1258
Macrophage system.....*1194; *1198
Magnesium sulphate effect on morphine..1247
Marriages 1241
Medical Papers, curtail publication.....1240
Medical Practice Acts: licenses, revocation; due process of law.....Ml-1252
Medical Society of the County of New York E-1228
Medical Syndicates, confederation.....1237
Medicolegal 1251
Meetings, Coming Meetings.....1252
Menopause, use of ovarian hormones....*1191
Menstrual cycle, essential mechanism...*1191
Metaphen, use of.....1245
Metrosalpingography ab-1264
Milk, human and cow's, copper in.....ab-1263
Monocytes *1194
Morphine, stable in aqueous solution?.....1247
magnesium sulphate effect on.....1247
withdrawal, insulin for combating symptoms after ab-1260
Mountain climbing, oxygen in.....1236
sanitary companies 1240
Muscle graft for hepatic hemostasis....ab-1261
Nephritis, acute, kidney functioning in.ab-1264
Nerve, blocking of posterior tibial.....*1212
Neurotropism of industrial substances...ab-1261
New York Academy of Medicine.....E-1228
News 1231
Oophorectomy and libido.....1246
Osteochondritis dissecans of radius.....ab-1264
Osteomalacia, viosterol effect on calcium and phosphorus of serum.....ab-1262
Ovary, endocrine activity.....*1189
excision and libido.....1246
hormone, modification of iodine metabolism by ab-1262
hormones.....*1189; ab-1262
Oxygen in mountain climbing.....1236
Pelvis inflammation, diathermy in.....ab-1260
Peppard, Stanley H.....1231
Phagocytosis and natural resistance.....*1193
Photographs, physicians', using.....E-1228
Physician as writer, lecturer and publicist.E-1228
Pituitary Body, anterior lobe and growth.ab-1261
Plants, medicinal, international congress on.1237
Pleuritis, serous, prognosis in child....ab-1261
Pneumolysis, intrapleural ab-1254
Poliomyelitis, immunity in.....*1199
treatment *1224
use of convalescent serum in.....1245
Pregnancy, albuminuria complicating..ab-1259
bilateral postpartum phrenicectomy...ab-1255
diabetes mellitus and.....ab-1256
ectopic, and intraperitoneal inundation.ab-1260
effect of viosterol on blood calcium and phosphorus ab-1262
metrosalpingography ab-1264
Procaine solutions, can they be autoclaved?.1247
Prostate, obstruction; electrocardiographic study *1221
Puerperal Fever, autohemotherapy.....ab-1262
Queries and Minor Notes.....1245
Quinidine therapy, intravenous.....ab-1260
Radio, medical consultations at sea by...1238
health talks by physicians over.....E-1228
Radio Program 1231
Radius, osteochondritis dissecans of head.ab-1264
Raynaud's Disease *1212
Reticulo-Endothelial System.....*1194
Rhus poisoning, diagnosis; treatment....*1201
poisoning, benzoyl peroxide for.....*1225
Sanitary equipment, characteristics.....1241
Scarlet Fever, milk-borne epidemic.....1231
Schools, medical, U. S. Navy, term extended 1235
Scientific world picture of today.....1235
Semilunar Bone, "malacia".....ab-1264
Serum sickness in rabbits.....1231
Sex, association for the scientific study of.1238
Sinus infection, climate and rest for.....1246
Skin reaction to foreign serum.....ab-1263
resistance and immunity.....*1193
tests, contact, scratch.....*1201
Society Proceedings 1252
Sodium citrate, aqueous solution as an alkalizing agent 1247
Soldier, European, hygiene of, in the colonies 1240
Solvents, neutropism of ab-1261
State Board Examinations.....1247
Sterilization, temporary,. new method..ab-1260
Sternum, heart disease following blow over.1245
Stomach, cancer, and achlorhydria.....*1217
pathologic conditions secondary to achlorhydria *1216
Sympathectomy, periarterial, effect on blood morphology ab-1261
Syphilis, development, vs. histology....ab-1264
Teeth, removal of retained roots.....1246
oral hygiene program.....1232
Temporal Bone, fracture into internal ear.1246
Testimonials, ethics of.....E-1228
Theelin *1189
Thoracocauterization ab-1263
Thyroidectomy for thyrotoxicosis in the young ab-1258
Tissue resistance and immunity.....*1193
Tonics and Sedatives.....Adv. page 28
Tubercle Bacilli, lysis, in sputum.....ab-1255
culture media ab-1253
Tuberculin, old, given subcutaneously for diagnosis ab-1255
Tuberculosis, diagnosis, sputum in....ab-1253
diagnosis, guinea-pig inoculation.....ab-1255
international federation against.....1237
mortality and World War.....ab-1255
transmission C-1244
virus; prophylaxis in the army.....1240
Tuberculosis, Pulmonary, intrapleural pneumolysis ab-1254
old tuberculin given subcutaneously for diagnosis ab-1255
pregnancy and bilateral postpartum phrenicectomy ab-1255
thoracocauterization ab-1263
Typhoid outbreak, Illinois.....1231
Urine, dehydration and anuria.....C-1245
Uterus, metrosalpingography ab-1264
Vasoconstrictor spasm, diffential diagnosis.*1212
Viosterol, effect on blood calcium and phosphorus ab-1262
Virus diseases, immunity in.....*1199
Vision, warning—the "save your natural eyesight" movement 1238
Vitamins 1235
A, anti-infective agent?.....E-1229
A, B, C and D, parenteral administration E-1230
Welfare agencies, guide to.....1233
Wilder, Russell M., returns to Mayo Foundation 1232
Workmen's Compensation Acts: operation; refusal to submit to.....Ml-1252

BOOK BUYING SIMPLIFIED We supply new and standard medical works of all publishers
ONE ORDER—ONE REMITTANCE
GET OUR LATEST BULLETIN **CHICAGO MEDICAL BOOK CO.** 430 S. Honore St. CHICAGO

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 97, No. 17 CHICAGO, ILLINOIS OCTOBER 24, 1931

ENDOCRINE ACTIVITY OF THE OVARY*

EDGAR ALLEN, PH.D.

COLUMBIA, MO.

The only sound basis for therapeutic treatment of menstrual disorders with hormones is a broad foundation of experimental evidence concerning the endocrine activity of the ovaries. I will summarize briefly in this paper the recent work on follicular and corpus luteum hormones and sketch in outline a conception of the factors responsible for the periodic changes in the genital organs during the menstrual cycle.

ANIMAL REACTIONS TO FOLLICULAR HORMONE

The hormone from the ovarian follicles ("theelin," "folliculin," "oestrin") is undoubtedly the principal ovarian hormone. The outstanding effect of this active substance is the production of rapid growth in the accessory genital organs. In the rat and the mouse, theelin is responsible for such rapid proliferation of epithelial cells as to replace completely the many layered vaginal wall in forty-eight hours. It exerts a similar growth stimulus on the uterus and mammary glands. It is probably responsible for maintenance of ciliation in the tubes and for the initiation of secretion in the uterus. In addition, it is responsible for the development of secondary sex characters. The illustrations in previously published articles [1] emphasize the growth stimulus exerted by follicular hormone (theelin) on genital tissues of the rat and the monkey.

One of the most interesting developments in work on follicular hormone has been Markee's [2] contribution of the study of vascular reactions in the endometrium in which a small piece is transplanted to the anterior chamber of the eye. His experiments consisted of autotransplantation of small sections of endometrium in the anterior chamber in positions where vascularization occurs. In the normal female rabbit in the period of sexual rest there is a normal rhythm of alternate vasodilatation and contraction. The transplanted endometrium remains pink for a short period and then blanches. If such an animal is ovariectomized vasoconstriction causes continued blanching. If theelin is injected to bring the animal into an experimental estrous period, the transplanted endometrium is flushed by continued vasodilatation.

This evidence is paralleled by the experiments on reddening and swelling of the sexual skin of monkeys.[3] These secondary sex characters, which develop at the time of puberty in young females, become extreme during the intermenstruum at the time of ovulation and retrogress somewhat at the approach of menstruation. This reddening and swelling can also be induced in ovariectomized animals by injections of theelin.

SOURCES OF THEELIN IN HUMAN GENITAL TISSUES

A considerable series of quantitative tests have been made of the follicular hormone content of human genital tissues.[4] These tests have been done in collaboration with Dr. J. P. Pratt of Henry Ford Hospital and Dr. Q. U. Newell of Washington University School of Medicine. The ovariectomized rat was the test animal. Fluid aspirated from follicles of human ovaries at operation was injected, and solid ovarian tissues were implanted in subcutaneous pockets in these animals. The full estrous growth of the vaginal wall was used as an indicator of positive reactions. By means of this short and clear cut "rat test" as a criterion of activity, a fairly thorough survey of sources of this active substance has been made by several investigators.[5] The splendid accomplishment of crystallization of this hormone by Doisy and his collaborators [6] and later by Butenandt [7] has followed.

Positive tests were obtained from fresh follicular fluid removed from the ovaries at operation, 0.37 cc. being the least amount effective.[8] The tissue walls of large follicles returned positive results when single pieces weighing as little as 0.18 and 0.22 Gm. were implanted. It is believed that further tests carried to higher dilutions will show greater concentrations of theelin in this tissue. That cortical stroma of the normal ovary shares little in the secretion of theelin was demonstrated by negative tests from implants of large pieces of this tissue from ovaries that contained in other regions either active follicles of corpora lutea.

Especial interest centered on the amount of theelin in the recent corpora lutea corresponding to ova recov-

* From the Department of Anatomy, University of Missouri School of Medicine.

* Read before the Section on Pharmacology and Therapeutics at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 10, 1931.

1. Allen, Edgar; and others: The Hormone of the Ovarian Follicle; Its Localization and Action in Test Animals, and Additional Points Bearing upon the Internal Secretion of the Ovary, Am. J. Anat. **34**: 133-181 (Sept.) 1924. Allen, Edgar; and Doisy, E. A.: The Induction of a Sexually Mature Condition in Immature Females by Injection of the Ovarian Follicular Hormone, Am. J. Physiol. **69**: 577-588 (Aug.) 1924. Doisy, E. A.; Ralls, J. O.; Allen, Edgar; and Johnston, C. G.: The Extraction and Some Properties of an Ovarian Hormone, J. Biol. Chem. **61**: 711-727 (Oct.) 1924. Allen, Edgar: The Menstrual Cycle of the Monkey, Macacus Rhesus: Observations on Normal Animals, the Effects of Removal of the Ovaries and the Effects of Injections of Ovarian and Placental Extracts into the Spayed Animals, Contributions to Embryology number 98, Carnegie Institution of Washington, Pub. 380, **19**: 1-44 (Aug.) 1927.

2. Markee, J. E.: Modification of the Vascular Rhythm in the Rabbit Uterus by Follicular Hormone, Anat. Rec. **48**: 28 (Feb.) 1931.

3. Allen (footnote 1).

4. Allen, Edgar: The Ovarian Follicular Hormone: A Study of Variations in Pig, Cow and Human Ovaries, Proc. Soc. Exper. Biol. & Med. **23**: 383-387 (March) 1926. Allen, Edgar; Pratt, J. P.; Newell, Q. U., and Bland, L. J.: Hormone Content of Human Ovarian Tissues, Am. J. Physiol. **92**: 127-143 (Feb.) 1930.

5. Allen, Edgar; and Doisy, E. A.: Ovarian and Placental Hormones, Physiol. Rev. **7**: 600-650 (Oct.) 1927. Parkes, A. S.: The Internal Secretions of the Ovary, London, Longmans, Green & Co., 1929.

6. Veler, C. D.; Thayer, Sidney; and Doisy, E. A.: Preparation of Crystalline Follicular Ovarian Hormone: Theelin, J. Biol. Chem. **87**: 357-371 (June) 1930.

7. Butenandt, A.: Untersuchungen über das weibliche Sexualhormon: Darstellung und Eigenschaften des kristallisierten "Progynons," Deutsche med. Wchnschr. **55**: 2171-2173 (Dec. 27) 1929.

8. Allen, Pratt, Newell and Bland (footnote 4).

ered from the tubes.[8] The smallest amounts to return positive reactions were 0.07 Gm., an unusually high yield for living tissues. The two corpora corresponding to twin ova recovered from the tubes [9] each contained more than 14 rat units of follicular hormone per gram. Since the recent corpus averages about 1.5 Gm., this would mean the presence of at least 42 rat units of the follicular hormone in these two corpora soon after ovulation.

Several corpora lutea removed at other times in the menstrual cycle were analyzed. Although this series of tests should be extended, it indicated that the amount of theelin in the human corpus decreases before the beginning of the next menstrual period.

During the first few months of pregnancy, theelin is present in high concentration in the human corpus. Two full term corpora removed at cesarean section contained very little if any of this active substance. Therefore the human corpus luteum of pregnancy ceases to secrete theelin during the later stages of pregnancy.

In addition to the follicle and corpus luteum, the chorionic vesicle and later the placenta in man contains large amounts of this active substance. The amounts are so great that it seems probable that the placenta itself may take over the secretion of theelin which is initiated by the follicle and continued (in woman) by the corpus luteum.

During pregnancy and the latter half of the menstrual cycle, theelin may be recovered from the blood (Frank and Gustavson). It occurs in such large amounts in urine during pregnancy that this is an abundant source of supply.

SPECIFIC CORPUS LUTEUM HORMONES

In this survey of sources of theelin, consistently negative results were obtained from corpora lutea of the principal food supply animals, the cow, the pig and the sheep. A tiny piece of living tissue from a recent human corpus weighing only 0.07 Gm., however, returned a positive rat test while three sheep corpora per test animal failed to induce the positive reaction. This is indeed a striking species difference which must be recognized whenever the endocrine function of the corpus luteum is considered.

The rapid accumulation of experimental evidence emphasizing the primary importance of follicular hormone has been followed by the direct experimental evidence that the corpus luteum may serve at least four, perhaps five, endocrine functions.

First, Hisaw [10] has induced resorption of the symphysis pubis of the pocket-gopher and relaxation of the pelvic ligaments of the guinea-pig, such as normally occurs in these animals at parturition, by the "one-two action" of follicular (theelin) and corpus luteum ("relaxin") hormones. These reactions are apparently endocrine mechanisms peculiar to certain animals and cannot be elicited in others. This specific corpus luteum hormone has not yet been demonstrated in the blood of women during pregnancy. Hartman, however, finds relaxation of the pelvic ligaments of the monkey on the approach of parturition.

Then, secondly, Corner and Willard Allen [11] and Hisaw,[12] independently, have succeeded in the experimental production of (*a*) progestational conditions in the endometrium of rabbits and premenstrual endometrium in monkeys, (*b*) deciduomas at sites of foreign body stimulation of the uterus and (*c*) (Corner and Allen) successful continuance of gestation in rabbits after double ovariectomy. Since in all cases the action of theelin must precede that of this corpus luteum hormone, "progestin," the latter is obviously complementary to theelin.

Thirdly, Hisaw [13] has induced the mucous transformation of the superficial layers of the vaginal epithelium of rodents, which is characteristic during pregnancy.

Fourthly, several investigators (Papanicolaou,[14] Kennedy,[15] Kelly [16] and others) have succeeded in delaying or preventing the occurrence of ripening of the follicles and the onset of estrus by injections of corpus luteum extracts. An inhibitory effect on the follicles has therefore been attributed to the corpus luteum. Similar results have been obtained, however, with extracts of testis and also extracts of other ovarian tissues; therefore, it still seems doubtful whether this last effect can be considered a specific corpus luteum reaction.

Fifthly, Knaus [17] and others have inhibited the contraction stimulus of solution of pituitary on the uterus by corpus luteum extracts, but a similar effect has also been described for follicular extracts. Therefore, the latter reaction remains to be proved a specific corpus luteum reaction.

The extent to which the human corpus luteum shares the aforementioned functions is still somewhat in doubt. Little direct experimental evidence has been produced because of the difficulty of obtaining enough human material to extract. The pelvic relaxation effect has not been demonstrated in blood from pregnant women. Since transformation of the vaginal wall in primates is not as extensive as in pregnant rodents, it is doubtful whether the corpus luteum has this third endocrine function in woman. There seems little doubt that the human corpus luteum secretes progestin during early pregnancy, but it is well known that such a secretion is unnecessary after the third month. There are several cases in the literature of the removal of corpora lutea even earlier in pregnancy without the interruption of gestation. Other animals seem to require it throughout pregnancy. Therefore, the work to date indicates that some of the endocrine functions attributed to specific corpus luteum hormones do not apply to all animals. The tests for activity of corpus luteum extracts are not so short and easy when compared with the rat test for theelin. For this reason, slower progress in the exploration of sources and the production of biologically

9. Allen, Edgar; Pratt, J. P.; Newell, Q. U., and Bland, L. J.: Human Tubal Ova: Related Early Corpora Lutea and Uterine Tubes, Contributions to Embryology number 127, Carnegie Institution Pub. 414, November, 1930, pp. 45-76.

10. Hisaw, F. L.: The Influence of the Ovary on the Resorption of the Pubic Bones of the Pocket Gopher, Geomys Bursarius (Shaw), J. Exper. Zool. **42:** 411-441 (Oct.) 1925; Experimental Relaxation of the Pubic Ligament of the Guinea-Pig, Proc. Soc. Exper. Biol. & Med. **23:** 661-663 (May) 1926.

11. Corner, G. W.: Physiology of the Corpus Luteum: I. The Effect of Very Early Ablation of the Corpus Luteum on Embryos and Uterus, Am. J. Physiol. **86:** 74-81 (Aug.) 1928; II. Production of a Special Uterine Reaction (Progestational Proliferation) by Extracts of the Corpus Luteum, ibid. **88:** 326-339 (March) 1929. Allen, W. M., and Corner, G. W.: III. Normal Growth and Implantation of Embryos After Very Early Ablation of the Ovaries, Under the Influence of Extracts of the Corpus Luteum, ibid. **88:** 340-346 (March) 1929.

12. Hisaw, F. L.; Meyer, R. K., and Fevold, H. L.: Production of a Premenstrual Endometrium in Castrated Monkeys by Ovarian Hormones, Proc. Soc. Exper. Biol. & Med. **27:** 400-403 (Feb.) 1930; Purification of Hormone of Corpus Luteum Responsible for Progestational Development and Other Reactions, ibid. **27:** 606-608, 1930.

13. Hisaw, F. L.; Fevold, H. L., and Leonard, S. L.: The Gonad Stimulating and the Luteinizing Hormones of the Anterior Lobe of the Hypothesis, Am. J. Physiol. **97:** 291-301 (May) 1931.

14. Papanicolaou, G. N.: A Specific Inhibitory Hormone of the Corpus Luteum, J. A. M. A. **86:** 1422 (May 8) 1926.

15. Kennedy: Corpus Luteum Extracts and Ovulation in the Rabbit, Quart. J. Exper. Physiol. **15,** 1925.

16. Kelly, G. L.: The Effect of Injections of Female Sex Hormone (Estrin) on Conception and Pregnancy in the Guinea-Pig, Surg. Gynec. Obst. **52:** 713-722 (March) 1931.

17. Knaus, Hermann: Zur Frage der Standarisation des Corpus luteum-Extraktes, Arch. f. exper. Path. u. Pharmakol. **151:** 371-380, 1930.

standardized purified extracts of corpora lutea must be expected. Since several species differ in these various reactions to corpus luteum extracts, generalizations should not be attempted until tests have been made in different mammals.

ESSENTIAL MECHANISM OF MENSTRUAL CYCLE

In outlining a conception of the probable mechanism of the menstrual cycle from recent experimental evidence, it might be said that toward the end of menstruation rapid growth of the follicles under stimulation from the anterior lobe of the hypophysis (Smith and Engle, Zondek and Aschheim) induces secretion of theelin to produce the growth phase in the accessory genital organs.[3] This includes accelerated growth of the vaginal epithelium, growth of the glands of the cervix and body of the uterus to the interval condition, probably some repair of ciliation of the tubes and, toward the end of this interval, the initiation of growth in the mammary gland tree including the nipple. Ovulation in woman, as judged from the recovery of tubal ova,[18] occurs on, or one or two days before the fourteenth day following the onset of previous menstruation in the regular twenty-seven or twenty-eight day cycle. There may, of course, be considerable variation in ovulation time in irregular cycles.[19] Following ovulation, as the ruptured follicle becomes transformed into the corpus luteum, there is a continued elaboration of follicular hormone by this tissue. Therefore, theelin from the corpus luteum must enter the blood stream along with such specific corpus luteum hormones as progestin, resulting in premenstrual transformation of the endometrium and in continued growth of the mammary glands. Ovulation with corpus luteum formation, although essential for the premenstrual endometrium transformation, is not necessary for menstruation.

Decrease in amount of theelin due to atresia of large follicles in normal animals or to cessation of theelin dosage after a series of injections in ovariectomized monkeys causes the onset of menstruation in the next few days.[20] Theelin, alone of ovarian hormones, seems sufficient to supply the essential mechanism of menstruation. That the anterior lobe of the hypophysis is concerned in some way has been shown by the recent work of Hartman, Firor and Geiling.[21]

In the case of pregnancy, the human corpus luteum continues the secretion of theelin through the third or fourth months at least. During the latter half of pregnancy this function wanes. The human corpus luteum probably loses the function of the production of progestin before the end of the third month, or, at least, continuation of this secretion is not essential to normal gestation. Beginning toward the end of the second month and in increasing amounts with the continuation of pregnancy and growth of the placenta, the chorion and then the placenta probably participate in the secretion of theelin.[22] This continued secretion of theelin during pregnancy is probably sufficient to explain the inhibition of menstruation during gestation. Toward the end of gestation, theelin and progestin undoubtedly exert a marked effect on the mammary glands. Most specific actions attributed to corpus luteum hormones apparently require a preparation by the growth stimulation of theelin first. The action of corpus luteum hormones is therefore directly complementary to the action of theelin.

SPECIES DIFFERENCES

There are many striking species differences in occurrence and action of these various hormones. So far as is known, theelin is present in the ovarian follicles of all mammals. To date, there have been no exceptions recorded. Progestin may be found in all corpora lutea during part of their functional life, but it is quite probable that the time during which it is effective during gestation varies considerably. The species difference in theelin secretion of the corpora lutea of woman and those of the cow, ewe and sow has been emphasized. Hisaw's corpus luteum hormone (relaxin), which causes the resorption of the symphysis pubis of the pocket-gopher and the relaxation of the pelvic ligaments of the guinea-pig, and which has been identified in the blood of the pregnant rabbit, has not been identified in human blood. The corpus luteum hormone which causes the mucous transformation of the superficial layers of the vagina in rodents is probably not present in the human corpus luteum, for these marked vaginal changes peculiar to rodents are not present in such a degree in the human vagina.

Another species difference in endocrine function is present in fetal membranes. Theelin can be extracted in large quantities from human placenta and from the umbilical cord. It is also present in the chorion of the horse and the cotyledonary placentas of the sheep and cow and may be recovered from amniotic fluid. So far, however, all tests of the zonular placentas of cats and dogs and the button placentas of rodents have been negative.[22] Other important species differences have been reported by Snyder and Wislocki.[23] in the hormone content of urine of different animals during pregnancy.

Some of these species differences are of the same order of magnitude as the species differences recently recorded for the gonad stimulating hormone of the anterior lobe of the hypophysis. The action of this substance on the mammalian ovary has been the subject of many recent papers (Smith and Engle, Zondek and Aschheim). In certain amphibians it has little effect on the ovary but a marked effect on the testis.[24] Another major species difference has been demonstrated in the hormone control of mammary gland growth. Corner [25] reported maximum growth stimulation of the mammary glands by injections of extracts of the anterior hypophysis in ovariectomized rabbits. Negative results were reported in similar experiments in the rat by Evans.[26]

SUGGESTIONS AS TO THERAPEUTIC USES

It has been shown in many animal experiments that the follicular hormone does not stimulate the develop-

18. Allen, Edgar; Pratt, J. P.; Newell, Q. U., and Bland, L. J.: Human Ova from Large Follicles; Including a Search for Maturation Divisions and Observations on Atresia, Am. J. Anat. **46**: 1-53 (July) 1930; (footnote 9).

19. Pratt, J. P.; Allen, Edgar; Newell, Q. U., and Bland, L. J.: Human Ova from Uterine Tubes, J. A. M. A. **93**: 834-837 (Sept. 14) 1929.

20. Allen, Edgar: Effects of Ovariectomy upon Menstruation in Monkeys, Am. J. Physiol. **85**: 471-475 (July) 1928. Powers, H. H.; Varley, J. R., and Morrell, J. A.: Preliminary Note on the Assay of the Follicular Hormone by Vaginal Administration, Endocrinology **13**: 395-398 (July-Aug.) 1929. Allen, Edgar: Further Experiments with an Ovarian Hormone in the Ovariectomized Adult Monkey, Macacus Rhesus, Especially the Degenerative Phase of the Experimental Menstrual Cycle, Am. J. Anat. **42**: 467-487 (Nov.) 1928.

21. Hartman, C. G.; Firor, W. M., and Geiling, E. M. K.: Anterior Lobe and Menstruation, Am. J. Physiol. **95**: 662-669 (Dec.) 1930.

22. Allen, Edgar: Hormone Content of the Placenta and Chorionic Membranes, Proc. Soc. Exper. Biol. & Med. **24**: 608-611 (March) 1927.

23. Snyder, F. F., and Wislocki, G. B.: The Effect of Ovulation in the Rabbit of the Injection of Urine from Pregnant Mammals, Anat. Rec. **48**: 34 (Feb.) 1931.

24. Burns, R. K., and Buyse, Adrian: The Effect of Administration of the Anterior Hypophysis upon the Immature Gonads of Amblystoma Larvae, Anat. Rec. **48**: 12 (Feb.) 1931. Adams, A. Elizabeth: Egg Laying in Triturus Viridescens Following Implants of Pituitary Glands of Bufo Terrestris, Anat. Rec. **48**: 37 (Feb.) 1931.

25. Corner, G. W.: Hormonal Control of Lactation; Non-Effect of Corpus Luteum; Positive Action of Extracts of Hypophysis, Am. J. Physiol. **95**: 43-55 (Oct.) 1930.

26. Evans, H. M.: Sex Differences in the Response of the Rat to Hypophyseal Growth Hormone, Anat. Rec. **48**: 18 (Feb.) 1931.

ment of follicles in the ovaries. Consequently primary hypo-ovarian conditions should probably be treated with anterior hypophysis extract when that is purified and biologically standardized. In cases of amenorrhea or scanty menstruation of long duration, treatment with follicular hormone has in a certain percentage of cases started cyclic activity which has in some instances persisted after cessation of treatment.[27] In other cases it has not proved effective. Disturbances in the secretion of other endocrine glands, especially the anterior hypophysis and thyroid, should be ruled out before administration of theelin.

Several reports have shown that theelin is sometimes effective in the treatment of extreme menopause symptoms, either operative or natural. A declining dose would be indicated in an effort merely to adjust the patient gradually from effects which are undoubtedly due to deficiency of this hormone.

Progestin would be indicated for therapeutic use in cases in which repeated difficulty in carrying the embryo through the early stages of gestation is encountered. It might also be used later in pregnancy in combination with theelin to carry on the stimulation of growth in undeveloped mammary glands. First, however, it must be standardized biologically. The matter of the rather difficult test reaction for this active substance, at least compared with that for theelin, will probably postpone the early therapeutic use of progestin.

SUMMARY AND CONCLUSIONS

1. The outstanding animal reaction to follicular hormone, "theelin," is growth of the accessory genital tissues.

2. Sources of theelin in human tissues have been partly explored with quantitative methods.

3. Specific reactions attributed to the corpus luteum hormones are outlined and discussed.

4. A conception of the essential mechanism underlying the menstrual cycle based on recent experimental evidence has been outlined.

5. Several interesting species differences in sources and reactions of various hormones in different animals have been reported.

6. Suggestions are made as to therapeutic uses of ovarian hormones.

ABSTRACT OF DISCUSSION

DR. J. P. PRATT, Detroit: Dr. Allen has emphasized the variation in physiologic response among different laboratory animals when injected with theelin. This variation is even more striking in human subjects. He has shown photomicrographs that demonstrate extensive growth of vaginal epithelium at the height of the sexual cycle, and a similar growth in response to theelin. That a similar growth of vaginal epithelium does not occur in the human subject has been proved by examination of vaginal epithelium removed at the time of hysterectomies performed at different phases in the menstrual cycle. Another opportunity for comparison is presented by the growth response following the injection of theelin. In animals this involves not only the uterus but the accessory organs as well, while in human beings only the uterus responds. It is not easy to measure accurately the amount of growth. In certain individuals, however, the build is such that the whole uterus can be palpated and a fair estimate of its size is possible. In one such individual, who had amenorrhea of many months' duration, I injected theelin at intervals. Following the injections the uterus enlarged, but not always to the same extent. At times, during the enlargement the consistency was firm; at others, it was moderately soft. The cause of this variation is not readily explained. The clinical indications for trying the effect of theelin are disturbances of menstruation, particularly amenorrhea. In primary amenorrhea, results have not been satisfactory. In cases of scanty and infrequent menstruation, a few satisfactory results have been obtained. One patient, followed for five years, menstruates regularly and in fair amount so long as thyroid and theelin are administered, but if either of these is withheld menstruation ceases. It would seem, then, that there is a limited group of women who have a theelin deficiency and that the theelin can be supplied artificially.

DR. EMIL NOVAK, Baltimore: Dr. Allen has stressed the fact that the outstanding physiologic effect of theelin is its stimulation of growth, and his sections confirm this view. I was interested in his statement that ciliary growth may be increased by the follicle hormone. In the common gynecologic disorder spoken of as functional uterine hemorrhage there is an associated hyperplasia of the endometrium produced by a relative increase and persistence of the follicle hormone. In cases of this type I have found cilia apparently increased, for they are certainly rare under normal conditions, even if sought for in fresh tissue, the most satisfactory method. With hyperplasia, on the other hand, one may find strips of mucosa almost identical with that in the tube, with a considerable sprinkling of ciliated cells. In this condition there is often a hypersecretion of the cervical glands, characterized by a mucoid leukorrhea, comparable to the hypersecretion noted by Dr. Allen in his experimental work. With regard to therapeutic applications, the condition that perhaps first suggests itself as justifying the use of theelin is amenorrhea. But if one considers the fact that theelin cannot possibly, even in a substitutional way, reproduce in the endometrium the histologic changes of the menstrual cycle, that at best it can bring about only the growth changes of the follicular phase, its limitations are at once apparent. If one adds to this the fact that the treatment must be repeated month after month, entailing usually large numbers of disagreeable hypodermic injections, one's enthusiasm is still more dampened. It is true that in a small proportion of cases one can produce some bleeding by theelin treatments, whether given hypodermically or by other routes, and that women may be encouraged or satisfied with this result. But one should not delude oneself into thinking that one has brought about menstruation. Such bleeding is comparable rather to the estrual type of bleeding seen in the lower animals. And then there is the uncertainty as to dosage in the human patient. Marrian and Parks have shown that while the standard effect of the rat unit is the production of vaginal cornification, about 200 times this amount is necessary for the production of copulation and of the typical estrual histologic changes in the endometrium. The human being is many hundreds of times heavier than the rat, and this ratio, multiplied by 200, would suggest the proper dosage for human patients. It is so great as to make present efforts seem wofully inadequate. Theelin will no doubt find important applications some day, but up to the present its use in gynecology has not yielded important results.

DR. EDGAR ALLEN, Columbia, Mo.: I should have mentioned that the sections of the monkey tissues that were shown are to be compared with the castrate condition. Of course, the interval stage shows considerable development when contrasted with the castrate condition. I agree with Dr. Pratt that probably there is more promise in the therapeutic use of anterior hypophysis preparations than in ovarian extracts, just as there would be in the case of the male sex hormone, as Dr. Moore pointed out. I doubt whether the possible therapeutic uses of theelin have been completely tested. There is one point in Dr. Novak's discussion to which Dr. Hartman, Dr. Corner and I have been giving much consideration; namely, as to whether the bleeding from the endometrium of castrate monkeys after the dosage of theelin has been stopped is truly menstruation. So far we have been unable to distinguish it, without examination of the endometrium, from menstruation following ovulation. Just preceding the menstrual flow the edema of the endometrium is typical. The glands do not undergo the premenstrual transformation, but that is not necessary for menstrual bleeding. Typical desquamation of the surface layers of the endometrium and menses follows cessation of injections of theelin in castrate monkeys.

27. Pratt, J. P.: Clinical Use of Ovarian Hormone (Theelin), Proc. Internat. Sex Cong., August, 1930.

TISSUE RESISTANCE AND IMMUNITY*

FREDERICK P. GAY, M.D.
NEW YORK

There is nothing more intriguing in the study of disease than the attempt to correlate changed functional activity with structural alteration. The precise chronological relationship of the one change to the other continues debatable and still divides those who have thought about it into two camps, but I know of no greater thrill that can come to a scientist than an observation, however minute, that evidences a new structure-function parallelism.

In immunology the explanatory pendulum has swung from structure to function, from phagocytes to antibodies, and is now, I believe, in the course of describing a larger arc of structural emphasis. I hope to convince you that this newer structural basis of immunity has contributed information not only of theoretical value but also endowed with practical possibilities of the greatest significance.

But before turning to immunity proper, let me begin by referring to certain obvious examples of quantitative and qualitative cell changes in adaptation to physical and chemical injury, some of which have long been recognized and to others which are merely suspected.

TOLERANCE TO PHYSICAL AND CHEMICAL INJURY

The skin is a relatively impervious tissue which fits it for its exposure to external injury. When subjected to intermittent pressure by an unyielding instrument it protects itself readily by the hyperplasia with which we are all familiar in callus formation.

Even more significant than these protective hyperplasias are the replacements of injured tissues by more impervious ones. It is that omnipresent patching material, the connective tissue, which is here predominant. Scar tissue in general, whether closing an incised wound, or replacing the ruptured coat in an aneurysm, or encysting a foreign body, an abscess, or a living parasite presents familiar examples of this metaplasia.

An interesting metaplasia in response to chemical injury has recently been described by MacNider.[1] Uranium nitrate produces a nephritis in dogs by localized injury of the epithelium of the proximal convoluted tubules. A proper initial dose of the poison is followed by more or less complete functional recovery. When the recovery is complete the tubules are found to be relined with their original epithelium, and such animals are as susceptible as normal animals to uranium nephritis. When functional restoration is less complete the tubules are relined, not with the original epithelium but with a flat nonspecialized type of cell which is insusceptible to a second graded dose of uranium.

This instance of acquired tolerance to a chemical disease agency is an interesting one since we possess no other morphologic basis for conditions of this sort.

The emergence of "arsenic fast" and "dye fast" spirochetes and protozoa is a significant problem in modern chemotherapy. These more or less specific drug fast parasites are in some way individually and hereditarily resistant.

The mechanism of the acquired tolerance of man and certain experimental animals to morphine has involved much inquiry. It is now generally agreed that no neutralizing substances are present in the blood of these habitués and we have been forced to assume that the normally susceptible brain cells have somehow become resistant. Meyer and Gottlieb[3] actually found more morphine in the brain of habituated rats than in controls.

I need hardly say that these scattered instances that I have recalled of a structural or functional basis for chemical and physical tolerance are a mere suggestion of what may eventually be known.

PHAGOCYTOSIS AND NATURAL RESISTANCE

When we turn to the consideration of the varying forms of natural resistance and acquired immunity from living disease agents, we find at once a firmer and wider structural basis of explanation. The clear demonstration by Metchnikoff that the cells of the host are actively concerned in its defense against invading parasites remains not only the first but the most fundamental explanation of immunity. The basic significance of the "phagocytic theory" of immunity was not widely or adequately appreciated until its recent extension along lines to which I now wish to direct attention.

Metchnikoff originally outlined his theory in the absence of any information on the humoral aspects of immunity. His observations were confined primarily to conditions of natural resistance, as shown in species differences. The adjuvant effect of opsonins or natural antibodies in this type of protection was not recognized until ten years after the tropin effect of Denys and Leclef[7] had been discovered. The mode of action of at least certain protective serums from hyperimmune animals, as due to their content in tropins, enlarged the phagocytic concept enormously and was in no conflict with the important contribution of humoral immunity except as regards proper emphasis.

The phagocytic theory developed through study of the protective effect of acute inflammation and was based on the essential digestive function of cells of mesodermal origin. In the lower forms in which Metchnikoff first studied digestion, inflammation and phagocytosis, mononuclear cells were involved. In mammals, however, the immediate response in inflammation is an outpouring of the polymorphonuclear cells, and these cells have naturally assumed the major rôle in all studies of the protective effect of inflammation in response to acute bacterial infections. No one questions the rapidity of polymorphonuclear response, their ubiquity and their phagocytic capabilities. They explain natural defense in those numerous conditions in which they are adequate. When they fail, the invading organism is called "virulent" and acute inflammation is an ineffective safeguard.

Throughout the literature, particularly in the study of experimental streptococcus infections, there are numerous references to a delayed phagocytic crisis in which recovery depends on the presence of mononuclear rather than polymorphonuclear cells. Metchnikoff was far from unaware of some of the phagocytic capabilities of mononuclear cells; in fact, it was he who gave them the name of "macrophages." In spite of the significance of such cells in the streptococcus infections to which I have referred, the Metchnikoff school

* Harvey Lecture, read before the New York Academy of Medicine, May 21, 1931.

* Owing to lack of space, this article is abbreviated in THE JOURNAL. The complete article will appear in the author's reprints.

* Read before the Section on Pathology and Physiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

1. MacNider, W. deB.: Science **73**: 103 (Jan. 23) 1931.

3. Meyer, H. H., and Gottlieb, R.: Pharmacology, Clinical and Experimental, translated by Halsey, Philadelphia, J. B. Lippincott Company, 1914.

7. Denys, J., and Leclef, J.: Cellule **11**: 177, 1895.

assigned only indirect protective functions to macrophages in acute bacterial infection. They seem concerned primarily with the disposal of animal cells rather than of bacteria, except those bacteria which produce chronic processes such as tuberculosis and leprosy, in which they are obviously actively phagocytic. Macrophages phagocytose red blood cells, and polymorphonuclears that may already have ingested bacteria.

The direct phagocytic relationship of macrophages to spirochetes and protozoa was clearly stated by Metchnikoff and has been increasingly emphasized.[12] In malaria, and in kala-azar and with the various spirochetes of relapsing fever, mononuclear phagocytosis and destruction are evident and selective. In addition, the essential though indirect action of these cells on the chemotherapeutic action of drugs has been clearly proved in spirochetal and trypanosome infections.

THE MACROPHAGE SYSTEM

When an inflammatory exudate passes from an acute to a subacute stage, the polymorphonuclear cells or microphages are replaced by macrophages. It was natural for earlier students, such as Adami[13] and others, who studied this condition to trace the origin of these cells to the large mononuclears (monocytes) of the circulating blood or to the endothelium of capillaries. Although Metchnikoff definitely includes endothelium, Kupffer cells and the reticulum cells of spleen and lymph nodes with the monocytes in his "macrophage system," he was in no position, with the methods available in his time, to penetrate deeply into the intergenetic relationships involved.

In recent years the increasingly active work by leading histologists, Ranvier,[14] Mallory,[15] Evans, Sabin,[16] Maximow[17] and Lewis,[18] to mention only a few of the more important investigators, has done much to establish the genetic interrelationship of the phagocytic mononuclear cells of mammals. By the use of tissue cultures and vital and supravital stains, by embryologic studies, by the study of pathologic conditions, and in the production of inflammatory exudates, a related group of cells of common origin in the mesenchyma, and less certain interconvertibility in adult stages, has been correlated. For convenience, this group of cells has usually been referred to as the "reticulo-endothelial system."[19] This designation with its morphologic implication is not wholly desirable, and, as phagocytic activity or potentiality is the predominant characteristic of these cells, it seems better to call it simply the "macrophage system."

Few final conclusions can yet be drawn as to the precise relationship of these cells to one another. In attempting to disentangle the confusing mass of data that are currently available we can point out certain generally accepted cell types but must realize that all gradations occur between them. It is in regard to the origin of one type of macrophage from another in the adult that greatest dispute arises. The question at issue is whether any one of the type cells may be transformed under functional stress into any other (unitarian theory) or whether there are shifts possible only in certain directions. To one who is not an active participant in these lines of investigation, simplification along the lines suggested by Maximow and by Lewis is the more appealing. The cells are all, to a varying and differential degree, phagocytic, which would tend to a functional unity apart from morphologic differences, and yet from the standpoint of various infectious agents the functions of the different cell types might well be separated.

In the accompanying diagram I have endeavored to depict the type cells of the macrophage series as they occur in different parts of the body and to show the potential transformations of one type of cell into the other. The heavy arrow lines indicate transformations that are more generally accepted, whereas the broken lines indicate possible transformations that rest on less, or at times simply more recent, information. The main supporters of each possible cell transformation are indicated on the lines which extend from the supposed cell of origin to its changed type.

Clasmatocytes.—These cells, originally described by Ranvier, are an essential and normal constituent of connective tissue. They have since been given a number of more or less synonymous appellations, among them "resting wandering cells" or "polyblasts,"[17] "tissue macrophages,"[20] "histiocytes" or "trailers."[11] The clasmatocytes which should be regarded as in a key position in the macrophage system, are characteristically receptive for vital stains, such as trypan blue, and the supravital stain, neutral red, both of which dyes accumulate in large masses in a vacuolar segregation apparatus and are retained there for long periods. Clasmatocytes may be found in the circulating blood under certain abnormal conditions[24] and may possibly give rise under normal conditions to the monocytes. Maximow and several other authors believe that interchange between fibroblasts and clasmatocytes is possible, but this assumption should be regarded as unlikely.

Monocytes.—The large mononuclear cells or monocytes of the circulating blood are characterized by a relatively large amount of protoplasm and an eccentric indented nucleus. They constitute from 4 to 8 per cent of the total leukocyte count. They do not take vital stains in the large masses characteristic of clasmatocytes. There seems undoubted evidence both by tissue cultures and by studies of chronic inflammation that these cells take part in the increase of tissue macrophages with coincident change in their staining characteristics. Three possible sources of monocytes from the other types of cells have been given, namely, from lymphocytes[2] from capillary endothelium[16] and from clasmatocytes. I am inclined to believe the origin from lymphocytes as the most certain of these sources.

Endothelium.—These fixed tissue cells are supposedly of direct origin from the fixed mesenchymal cells. They are believed by Mallory and others to give rise to the histiocytes of connective tissue, to the epithelioid cells of tubercles and even to the cells free in serous cavities,[26] although the latter possibility is not now generally believed.

Other Fixed Tissue Macrophages.—The lining cells of the spaces of the liver (Kupffer cells) and the reticular cells in spleen and lymph glands are recognized

12. Linton, R. W.: Reticulo-Endothelial System in Protozoan Infections, Arch. Path. **8**: 488 (Sept.) 1929.
13. Adami, J.: Inflammation, London, Macmillan & Co., 1907.
14. Ranvier, L.: Compt. rend. Acad. d. sc. **110**: 165, 1890.
15. Mallory, F. B.: J. Exper. Med. **3**: 611, 1898.
16. Sabin, Florence R.: Physiol. Rev. **2**: 38 (Jan.) 1922.
17. Maximow, A. A.: The Morphology of the Mesenchymal Reactions, Arch. Path. **4**: 557 (Oct.) 1927; Arch. f. exper. Zellforschung **5**: 169, 1928.
18. Lewis, W. H.: The Harvey Lectures of the Harvey Society of New York, 1925-1926.
19. Aschoff, Ludwig: Ergebn. d. inn. Med. u. Kinderh. **26**: 1, 1924.
20. Evans, H. M., and Scott, K.: Carnegie Institution of Washington, D. C. **10**: 48, 1921.
24. Simpson, M. E.: J. M. Research **43**: 77 (April-May) 1922.
26. McJunkin, F. A.: Am. J. Path. **1**: 305 (May) 1925.

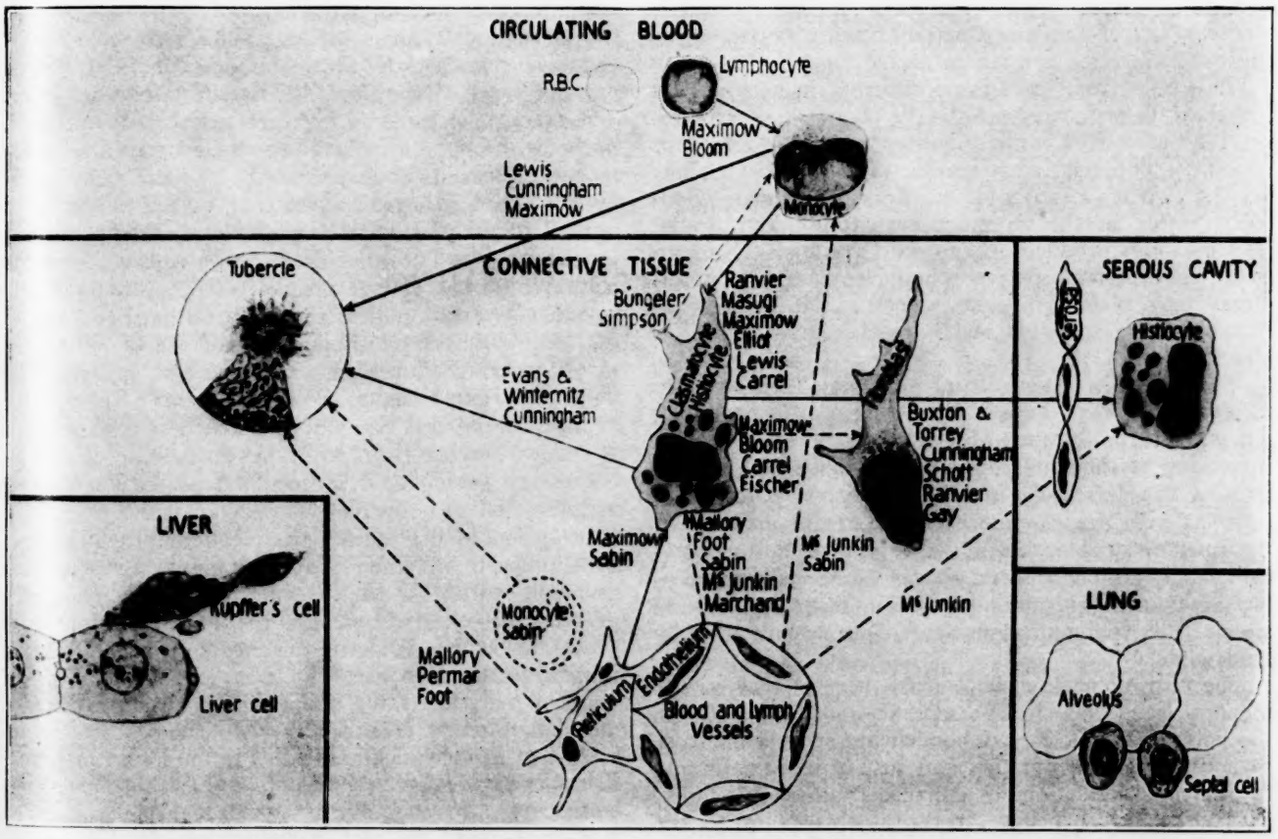
as being actively ameboid and phagocytic. The septal cells lining the pulmonary alveoli, which have long been known to be phagocytic for dust particles, are now becoming recognized as mesenchymal in origin and phagocytic in function rather than from the epithelium.[27]

We are concerned here, of course, with infections and I may simply mention in passing that the mononuclear group of cells which I have just described is apparently of vital significance in such processes as carbohydrate metabolism, iron metabolism and blood destruction and formation, and lipoid storage, particularly as is shown in its derangement in the diseases known as xanthomatosis.

The implication of the macrophage system in these various functions and in the various processes of resistance and immunity to animate agents of disease is evidenced by abnormality in the way of hyperplasia or destruction in individual instances of recovery or fatality, but more particularly through experimental attempts that have been made to interfere with the constituent cell groups. This interference has been brought about by the destruction or mechanical removal of certain constituent parts of the system through spleen ablation or the use of poisons, such as benzene and x-rays, that are known to affect the hematopoietic system. Or, again, stimulation or blockade of the system has been attempted by the injection of various materials that have been shown to localize in macrophages.

I have already suggested that we may eventually learn to distinguish certain specific functional reactions for different bacteria and parasites in such relatively distinct cells as the endothelium, the monocytes and the histiocytes. It is equally possible that specific stimulants for each of these types of cells may eventually be recognized.

The so-called blockade of the reticulo-endothelial system will be analyzed in more detail a little later. Dyestuffs such as carmine and inert particles such as the carbon of india ink have been used for this purpose and also colloidal preparations of iron and silver, to say nothing of colloidal dyestuffs such as trypan blue and isamine blue. These substances are invariably electronegative. There can be no question that an attempted blockade of this sort, which is never complete, may result in two apparently diverse but wholly consistent processes; that is to say, on the one hand in stimulation of the phagocytic cells, which are known to store this material and therefore, in their increased activity, or, on the other hand, in interfering seriously with their other metabolic functions.



The supposed intergenetic relationships and convertibility of cells of the "macrophage (reticulo-endothelial) system" of mammals. The authorities mainly responsible for the supposed changes are given on the arrowed lines. Heavy lines indicate more generally accepted type cell changes; dotted lines show less authenticated or more recent conceptions.

When we turn directly to the results of interference with the macrophage system, by the means that I have indicated, we find that infection in the normal animal is either facilitated, that is to say, the system has been thrown out of function, or, on the other hand, infection is prevented, which means that the macrophage system has been stimulated to greater activity.

As a reverse of the process of infection it has been shown that the injection of bacteria intravenously may interfere with the segregation of dyestuffs from the general circulation by these cells. I have already referred to the essential participation of the macrophage system in chemotherapy. Arsenicals and other parasitic therapeutic agents may fail to sterilize animals

27. Fried, B. M.: Origin of Histiocytes (Macrophages) in Lungs, Arch. Path. & Lab. Med. 3: 751 (May) 1927.

infected with spirochetes and protozoa when spleen removal or blockade has been employed.[36]

ENHANCED RESISTANCE

The search for macrophage attracting substances is important as a means of increasing natural resistance to local infection. The experience that Morrison and I had in preventing streptococcus infections in the susceptible pleural cavity of rabbits convinces us that remarkable increase in resistance results when sufficient clasmatocytes are present. The older observations on the beneficial results of a macrophage crisis have been amplified by showing that different areas in a given animal vary in their resistance to streptococcus infection in accordance with macrophage availability. Pleural cavities prepared long enough beforehand by indifferent substances such as broth or aleuronat are lined with granulation tissue containing numerous clasmatocytes and are highly resistant, whereas acutely inflamed cavities with polymorphonuclear infiltration are not protected.[37]

Once mobilized, there is no difficulty in demonstrating that clasmatocytes selectively phagocytose streptococci as compared with polymorphonuclear cells also present. The relative longevity of clasmatocytes has been shown by Lewis's experiments. The main virulence factor in the streptococcus would seem to be its leukocidin production, and we have recently found that, whereas both polymorphonuclears and mononuclears may phagocytose streptococci, the former are destroyed by leukocidin whereas the latter resist its effect.

The results in experimental infections with a highly virulent streptococcus are in one respect exceptional. They are certainly not to be paralleled in experimental infections of the same animal, the rabbit, with organisms of the *Pasteurella* group, with *Spirochaeta pallida* or even with the pneumococcus. Careful analysis of the pneumococcus problem will show presently, however, that, although macrophages alone will not protect, they are critically effective under conditions in which the polymorphonuclears are again wholly inadequate.

The only point I wish to make here is that mobile mononuclear cells, when present, are more efficient than the polymorphonuclears in combatting at least one type of acute bacterial infection and justify us in referring to this condition as one of enhanced natural resistance.

One should, I believe, refer at this point to the second and current phase of Besredka's work [43] on what he refers to as local immunity. Irrespective of any practical usefulness of this method in therapy, I believe there can no longer be any doubt that the effect produced is a nonspecific one. Besredka's so-called desensitizing effect is simply an enhancement of natural resistance through clasmatocyte stimulation. The work of Morrison and myself clearly showed the mode of action of plain broth, and Gratia,[44] Mallory and Marble,[45] Miller,[46] and Freedlander and Toomey [47] have all shown that Besredka's "antivirus" is no more effective than uninoculated broth.

ACTIVE IMMUNITY

The results obtained in those striking though rare instances of passive immunity by injecting the serum of hyperimmune into normal subjects has unquestionably led to the exaggeration of the importance of antibodies in active immunity. Not only are antibodies of whatever variety present in smaller amounts in the actively immune animal than in those artificial producers of an antiserum, but they may actually be entirely lacking in individuals who are most highly protected against an infection through recovery, following typhoid, for instance. At all events, a reconsideration of the importance of the tissues, as contrasted with the fluids, in conditions of active immunity has begun in recent years.

My work with Morrison [23] in 1923 strongly evidenced that destruction of the streptococcus in actively immune rabbits is due to increased responsiveness of the clasmatocytes, and these results were more conclusively demonstrated by streptococcus infection in various parts of the body by Bass [49] two years later. The precise mechanism of general active immunity has, however, been even more fully studied with the pneumococcus by Singer and Adler,[50] by Tudoranu [51] and by Wright.[52] They all agree that, in active immunity against types I, II and III pneumococci, antibodes are indeed present but final disposal of injected cocci is referable to macrophage phagocytosis. Although their conclusions are doubtless correct, it is hard to be sure of the precise relative importance of the tropin action of the specific antibodies which are also present. In Tillett's [53] experiments, however, with panimmunity against the several types of pneumococci produced by R strains derived from any type, no type specific antibodies are present and protection must be due to cell activity. Tillett notes that whole blood is more effective than serum in the limited passive immunity produced by the serum of these actively immune animals, and although anti-R species-specific immune bodies are present, the cell effect must be the more important one.

Another quite different instance of pure histologic immunity has been carefully described in the studies on bird malaria by the Taliaferros [54] and by Cannon and Taliaferro.[55] There is no evidence of humoral or indeed of intracellular antibodies in the latent infection of canaries by *Plasmodium cathemerium*, but the splenic phagocytes are actually increased and superinfection leads to a rapid disposal of the parasite by a mononuclear phagocytosis that is apparently qualitatively as well as quantitatively superior.

LOCAL IMMUNITY

The study of conditions of active local immunity as contrasted with active general immunity has thrown the greatest light on the precise mechanism of the state as a whole. When I undertook the study of experimental erysipelas in the rabbit with Miss Rhodes [56] some years ago it seemed impossible to be sure that the condition of local immunity described

36. Jungeblut, C. W.: Ztschr. f. Hyg. u. Infektionskr. **107**: 357, 1927.
37. Gay, F. P.; Clark, Ada R., and Linton, R. W.: Histologic Basis for Local Resistance and Immunity to Streptococcus, Arch. Path. **1**: 857 (June) 1926.
43. Besredka, Alexander: Local Immunization, Specific Dressings (edited and translated by Dr. Harry Plots), Baltimore, Williams & Wilkins Company, 1927.
44. Gratia, A.: Compt. rend. Soc. de biol. **89**: 826, 1923.
45. Mallory, T. B., and Marble, A.: J. Exper. Med. **42**: 465 (Oct.) 1925.
46. Miller, C. P., Jr.: Ztschr. f. Hyg. u. Infectionskr. **107**: 253, 1927.
47. Freedlander, S. O., and Toomey, J. A.: J. Exper. Med. **47**: 663 (May) 1928.
49. Bass, F.: Ztschr. f. Immunitätsforsch. u. exper. Therap. **43**: 269, 1925.
50. Singer, E., and Adler, H.: Ztschr. f. Immunitätsforsch. u. exper. Therap. **41**: 71, 468, 1924.
51. Tudoranu, G.: Ann. de l'Inst. Pasteur **40**: 606 (July) 1926.
52. Wright, H. D.: J. Path. & Bact. **30**: 185 (April) 1927.
53. Tillett, W. S.: J. Exper. Med. **45**: 713 (April), 1093 (June); **46**: 343 (Aug.) 1927; **48**: 791 (Dec.) 1928.
54. Taliaferro, W. H., and Taliaferro, L. G.: J. Prev. Med. **3**: 209 (May) 1929.
55. Cannon, P. R., and Taliaferro, W. H.: J. Prev. Med. **5**: 37 (Jan.) 1931.
56. Gay, F. P., and Rhodes, Bernice: J. Infect. Dis. **31**: 101 (Aug.) 1922.

by Wassermann and Citron [57] was anything more than local mobilization of antibodies coincident with a state of general active immunity. Our results convinced us that a locally superior mechanism for the disposal of bacteria could be produced without a generalized protection of other areas. In other words, the skin could be protected by skin immunization without increasing the resistance of the pleura or the body as a whole.

The absence of demonstrable generalized antibodies is a correlative phenomenon in local immunity that has been particularly emphasized by Besredka in his studies. The practical appeal of this author's work in mouth immunization against enteric infections, and skin immunization against anthrax has done much to awaken general interest in local immunity. But here again I differ with him radically on the theory involved, and theory, as ever, rather than practice, is the finger that points to future discovery. The possibilities of active immunization against bacteria by the unobjectionable method of swallowing them was demonstrated by Pasteur in chicken cholera, and there seems little doubt that vaccination by the mouth against typhoid may be effective. The protection thus produced is not, however, due to closure of the "specific portal of entry" or of an area of lesser resistance, as Besredka assumes, as is shown indirectly in experiments such as those of Ross [58] on general pneumococcus immunity accomplished by the same route. Skin immunization in anthrax may turn out to be the best practical method, but the skin is not the only susceptible area but simply one of several localities that is free enough of phagocytes to allow the anthrax bacillus time to assume its deadly capsule.

The precise cell mechanism of certain instances of local immunity now stands beautifully revealed in the work of Stuppy, Cannon and Falk [59] and of Cannon and Pacheco.[60] Stuppy, Cannon and Falk found that the respiratory tract of rabbits may be protected by spraying cultures of the pneumococcus in the throat. The animals show no evidence of generalized antibody production but are protected against intrabronchial insufflation of the micro-organism. The protective reaction is demonstrably due to an outpouring of mononuclear cells.

Cannon and Pacheco have found that, when intracutaneous infections of staphylococcus are produced in normal guinea-pigs, they respond by a polymorphonuclear phagocytosis. After recovery from repeated doses of staphylococcus vaccine, the inoculated area contains more macrophages than normal and these cells are apparently still further increased and are selectively phagocytic for living staphylococci, which they segregate and prevent from further invasion.

Such experiments suffice to show the importance of the macrophage system in local active immunity, but it may well be asked whether their mere increase in numbers suffices to explain the superiority and specificity of local immunity over enhanced local resistance. The ordinary adjuvant tropin effect so common in general active immunity would seem to be ruled out by absence of antibodies in the blood of these animals. But are not local antibodies present or rapidly produced? This seems strongly indicated in the experiments of Cannon and Pacheco, who speak of a characteristic "agglomeration" of the staphylococci in the immune skin. Can we go further and give any actual basis for a purely hypothetic "umstimmung" or "retuning" of cells so brilliantly imagined by Wassermann and Citron? Is there clear demonstration that accumulated macrophages may be remobilized in adjacent areas? This was certainly shown in my experiments with Linton and Clark and by Linton alone. But such response was not specific in that the accumulated cells of normal animals were involved. Our demonstration that after recovery from experimental erysipelas the entire skin and not simply the recovered portion of it is protected seems also evidence in point.

Much more work is needed before it can be accepted as certain that the phagocytes in actively immunized animals respond specifically by rapid mobilization and perhaps by specifically increased metabolism when the same micro-organism again enters the body. It has for many years been assumed that the leukocytes of immune animals are no different from those of normal animals and that their superior response differs solely through the presence of tropins in the ambient serum. The recent work of Wygodtschikoff and Manuilowa [61] may well lead to a reconsideration of this question. I, myself, am also inclined to attribute the extraordinary hemophagic activity of the immune cells in tissue culture described by Bloom to an inherent and inherited acquired mechanism rather than to adherent tropins as he does. In a similar manner Loewenthal and Micseh [62] have shown that tissue cultures from the spleen of pneumococcus immune rabbits phagocytose pneumococci specifically. Here, indeed, lies a field for future exploration.

ANTIBODY FORMATION

I have given some of the reasons which lead me to assume that the occurrence of antibodies in conditions of actual protection is distinctly subsidiary in importance to that of cell activity. But even so antibodies are of extreme value not only in increasing phagocytosis but also in diagnostic procedures. Passive immunity, furthermore, as at present practiced, depends entirely on a transfer of antibodies. It is therefore of great importance to learn more of the location and method of antibody formation.

Following the discovery of antitoxins, it became important to learn the origin of these extraordinary substances. Buchner [63] assumed that owing to their specificity they must be formed directly from their antigens, and Manwaring [64] and others have recently reconsidered this hypothesis largely on the basis of the undoubted possibility of producing antibodies in a serum-antigen mixture in vitro without the presence of cells. But even in the absence of cells, cell enzymes are present in serum which is in itself an artificial product. At best, the only change which seems to me likely in the general belief that cells form antibodies is that this formation may also to some extent take place in cell extracts and that antibodies might be formed by cellular proteolytic enzymes from antigens rather than built up from host proteins. This might still offer the desirable explanation for specificity and not be inexplicable on the ground of disproportion in

57. Wassermann, A., and Citron, J.: Ztschr. f. Hyg. u. Infektionskr. **50**: 331, 1905.
58. Ross, Victor: J. Immunol. **12**: 219 and 237 (Sept.) 1926.
59. Stuppy, G. W.; Cannon, P. R., and Falk, I. S.: J. Prev. Med. **5**: 97 (March) 1931.
60. Cannon, P. R., and Pacheco, G. A.: Am. J. Path. **6**: 749 (Nov.) 1930.
61. Wygodtschikoff, G. W., and Manuilowa, N. S.: Ztschr. f. Immunitätsforsch. u. exper. Therap. **68**: 480, 1930.
62. Loewenthal, Hans, and Micseh, Gabriel: Ztschr. f. Hyg. u. Infektionskr. **110**: 150, 1929.
63. Buchner, H.: München. med. Wchnschr. **40**: 449, 480, 1893.
64. Manwaring, W. H.: J. Immunology **19**: 155 (Aug.) 1930.

dosage [65] or the increase of antibodies after bleeding or following pilocarpine.[66]

I need not go further into the older ineffective methods of attempting to determine the locus of antibody formation. The most convincing line of attack that has been proposed lies in the use of the various dyestuffs and colloids, already mentioned, which are recognized as having a particular affinity for the cells of the macrophage system. The constituent cells of the macrophage system may be distinctly reduced by removing the spleen and then attempting blockade of the remaining cells. There is unquestionably selective action in accordance with the particular blockading material that is employed and we may well conceive of a direct relationship between the blockading material and the antibody that is being sought for. More convincing results would, I believe, be obtained if a mixture of the materials were used in a given experiment rather than some single dyestuff or blockading substance. Furthermore, much depends on the amount of dyestuff that is used, the duration of the series of injections employed, and whether or not blockade is begun before or simultaneously with injection of the antigen. Unquestionably the amount of antigen employed should be minimal.

In spite of all the difficulties and limitations in attempting to prove that the macrophages are responsible for antibody formation, a careful survey of the literature during the past ten years shows that well over 75 per cent of the investigators have obtained distinct variations in antibody formation when blockade was attempted. This variation has usually been in the form of a decrease, but there are also striking examples of increased antibody formation when "blockading" substances are utilized. The apparently divergent results are wholly consistent. Small amounts of dye stimulate the antibody-producing cells and large amounts throw them out of commission.[67]

When the individual antibodies that have been studied are considered in this regard, there is almost complete agreement that hemolysin production is interfered with by blockade and so also is anaphylactic shock. There is practically no disagreement as to a positive effect of blockade on precipitin formation. Most doubt as to the positive influence of blockade has arisen in connection with the study of agglutinins, and here unquestionably the proper dosage of antigen to blockading material accounts for failure.

MACROPHAGES AND PASSIVE IMMUNITY

The greatest significance of the macrophage system lies in its possible relationship to conditions of passive immunity. The antitoxins to the poisons produced by the diphtheria bacillus, the tetanus bacillus and others are highly effective in neutralizing their respective poisons not only in the test tube but also under actual clinical conditions, provided the toxin has not already become fixed on susceptible cells. There is no reason as yet to assume that the cells of the host are essential in bringing about toxin-antitoxin neutralization, although they may yet be shown to be so.

On the other hand, the failure that has attended the use of antiserums directed against bacteria themselves rather than their toxins is notorious. No antibacterial serum except the one employed against the meningococcus can be claimed to have been markedly successful. This single successful example points, I believe, to the reasons for failure in other instances. As Dr. Clark and I [71] suggested two years ago, the ineffectiveness of antibacterial serums would lie, not in their deficiency in suitable antibody, but in the absence of sufficient tissue response in the normal recipient to complete the tropinizing effect furnished by the antiserum. Passive immunity differs from active immunity precisely in this respect. Antimeningitis serum alone is effective because it is injected in an area in which a cellular exudate is available as well as the parasite.

When we advanced our hypothesis there were few concrete illustrations available to indicate that the addition or stimulation of cells would increase the effectiveness of passive immunity. We had a mere suggestion in our own work [72] that a relatively inefficient antistreptococcus serum may be effective when cell accumulations are present, and in a degree that outstrips the enhanced resistance due to the cells themselves. Jungeblut [73] in agreement with a suggestion from Lippmann's [74] work showed that antipneumococcus serum is ineffective in mice with reticulo-endothelial blockade. The most concrete illustration was furnished by the work of Dr. Clark [75] herself, who showed that, although granulation tissue fails to protect rabbits against type I pneumococcus, as it does against streptococcus, it is differentially protective against slightly tropinized pneumococci that are lethal for normal animals or for animals with a polymorphonuclear exudate.

With these ideas in mind we have been engaged in attempts to render antibacterial serums more effective under experimental conditions, by adding cells or stimulating cells in the passive recipient of the serum. Our results in streptococcus infections made us feel certain a year ago that our hypothesis was in the main correct.[76] We found that the cellular exudate of an immune animal protects a normal animal against the streptococcus better than corresponding immune serum. A normal exudate has no effect when passively transferred. The antiserum has only slight therapeutic value but, when combined with normal cells, is markedly effective.

Our first thought was that this enhanced passive immunity, which we are seeking to perfect, is due to the direct action of the passively transferred cells; but further study leads us to believe that the exudates employed act rather as cell stimulants for the recipient and can perhaps be replaced to advantage by simpler substances. It is our current opinion that stimulation of the macrophages gives more protection than stimulation of the polymorphonuclear cells in their combination with antiserum.

I hope that I have made it apparent that the mesenchymal mononuclear cells, which comprise the macrophage system of mammals, are the elements which constitute the most essential defense mechanism of the body against the living agents of disease. They are superior in this regard to the more readily attracted polymorphonuclears, even in acute bacterial infections. They are not only directly effective through phagocytosis but produce the antibodies which increase their phagocytic power. The striking properties of anti-

65. Ehrlich: Deutsche med. Wchnschr. **17**: 976, 1891. Knorr, A.: München. med. Wchnschr. **45**: 321 and 362, 1898.
66. Roux, E., and Vaillard, L.: Ann. de l'Inst. Pasteur **7**: 65, 1893. Salmonsen, C. J., and Madsen, T.: Ibid. **12**: 763, 1898.
67. Jungeblut, C. W., and Berlot, J. A.: J. Exper. Med. **44**: 129 (July) 1926.
71. Gay, F. P., and Clark, Ada R.: Science **69**: 604 (June 7) 1929.
72. Gay, F. P., and Clark, Ada R.: J. Infect. Dis. **36**: 233 (Feb.) 1925.
73. Jungeblut, C. W.: J. Exper. Med. **47**: 261 (Feb.) 1928.
74. Lippmann: Ztschr. f. Immunitätsforsch. u. exper. Therap. **24**: 107, 1915.
75. Clark, Ada R.: Rôle of Clasmatocytes in Protection Against Pneumococcus, Arch. Path. **8**: 464 (Sept.) 1929.
76. Gay, F. P., and Clark, Ada R.: J. Exper. Med. **52**: 95 (July) 1930.

bodies have served to exaggerate their importance in actual protection and to obscure the much more important underlying functions of the tissues. Further progress in immunity would seem to lie in understanding differential cell participation better, and therapeutic advances will doubtless attend this increased knowledge.

630 West One Hundred and Sixty-Eighth Street.

IMMUNITY IN VIRUS DISEASES*

W. LLOYD AYCOCK, M.D.

BOSTON

The development of immunity to certain infectious diseases in normal individuals similar to that following an attack of the disease has been tacitly accepted by most students of the subject as being due to subclinical infection with the disease virus. The acceptance of this view not only carries with it far reaching implications in regard to the epidemiology of certain diseases but also would bring into question the feasibility or desirability of carrying out certain preventive measures and would turn lines of investigation looking toward the practical control of certain diseases into entirely new channels. For example, if it becomes evident that a given virus is well nigh universal in its distribution and causes only an immunity in the majority of individuals on initial exposure, which will protect against any subsequent exposure and causes the disease only comparatively rarely, it would appear more logical to search for some other circumstance than exposure to the virus alone, which determines infection rather than subclinical immunization, instead of undertaking the far larger and perchance impossible task of preventing exposure to the virus altogether.

Perhaps, largely for the reason that in certain diseases, for example, poliomyelitis, the extent to which this immunity occurs so far exceeds the demonstrated distribution of the virus, and because in a general way its extent increases with age, the idea of widespread subclinical immunization by the virus has not gone unchallenged, it being held that adult immunity arises spontaneously with increase in age and is not antigenic in origin.

Recent demonstrations of the widespread occurrence of the viricidal action of normal adult serum for poliomyelitis [1] and of a similarly extensive anti-yellow fever serum (in an endemic area) [2] on the one hand, and the finding of precipitins and agglutinations in increasing proportion with age, against such noninfectious agents as sheep and rabbit erythrocytes,[3] antigens that have been presumed never to come in contact with internal tissues, and apparently erroneously so,[4] on the other hand, have raised anew, in the minds of some, the question as to whether such adult immunity to infections is due to previous exposure to their viruses. Editorial discussions under such headings as panimmunity, automatic environmental vaccinations, upsetting immunologic tenets and phylogenetic immunologic recapitulation,[5] relying largely on the observation of the development of "antibodies" to supposedly nonabsorbable antigens, such as sheep and rabbit proteins, come to such conclusions as "Nor can epidemiologic deductions from observed mass immunization be assumed to be more than of tentative validity" or "There are many immunologists who prophesy that a spontaneous maturation panimmunity eventually will be proved." The idea that increasing immunity with age is due to subclinical infection is accepted with reserve by others; for example, "The natural inference is that the immune principle is acquired as a result of subclinical infections . . . though it is possible that it may not rest altogether on this basis.[6]

These discussions do not seem to have taken into consideration any of the features of adult immunity, other than the generalization that it increases with age, and rather assume that it is a universal phenomenon, correlating solely with maturation (increase in age).

In view of the epidemiologic importance of the question as to whether adult immunity is the result of exposure to virus or is merely a maturation phenomenon in regard to the reliance which can be placed in certain control measures and in directing further research on such diseases, a review of cogent data on the subject would seem to be worth while.

In the virus diseases the only antibody or immune reaction the existence of which appears to be generally accepted or for which practical tests are available is the viricidal antibody, as shown by so-called neutralization tests, protection tests or passive immunization, and the as yet questionable curative effect of immune serum. That the viricidal antibody is an indication of exposure to virus is shown by the facts that:

1. It is not found in an animal known not to have been exposed.
2. It can be produced experimentally only by virus.
3. In diphtheria, the test corresponds with the test for antibacterial antibody.

By the use of such tests, data comparable with those for bacterial diseases are in certain instances available on virus diseases while in others, for example poliomyelitis, the restriction imposed by the necessity of using expensive laboratory animals has enabled only limited tests to be made. In such a case the significance of these tests lies not so much in the scope of the observations themselves but more largely in their correspondence with the more complete data relating to immunity in some of the bacterial diseases. Again, some one aspect of the process of immunization may be demonstrable in one disease and not in another, owing, for example, to such factors as variation in areas of prevalence or in adequate technic for the ascertainment of certain phenomena to be studied. For example, yellow fever occurs only in restricted areas, enabling comparisons with areas free of the disease, while diphtheria is practically world wide in its distribution. Or, for diphtheria, a comparatively simple technic is available for the determination of the carrier rate, whereas no satisfactory means are as yet available for

---

* Read before the Section on Pathology and Physiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

* From the Department of Preventive Medicine and Hygiene, Harvard University Medical School, and the Research Laboratory of the Vermont Department of Public Health.

* The work on which this paper is based was supported by the Harvard Infantile Paralysis Commission, a fund privately donated to the Vermont Department of Public Health and a gift from the International Committee for the Study of Infantile Paralysis.

1. Aycock, W. L., and Kramer, S. D.: J. Prev. Med. **4**: 189, 201 (May) 1930; J. Exper. Med. **52**: 457 (Oct.) 1930. Shaughnessy, H. J.; Harmon, P. H., and Gordon, F. B.: J. Prev. Med. **4**: 463 (Nov.) 1930. Fairbrother, R. W., and Brown, W. G. S.: Lancet **2**: 895 (Oct. 25) 1930.
2. Beeuwkes, Henry; Bauer, J. H., and Mahaffy, A. F.: Am. J. Trop. Med. **10**: 305 (Sept.) 1930.
3. Friedberger, E.; Bock, G., and Fürstenheim, A.: Ztschr. f. Immunitätsforsch. u. exper. Therap. **64**: 294, 1929.
4. Coca, A. F.: J. Immunol. **19**: 405 (Oct.) 1930.
5. Parimmunity, editorial, J. A. M. A. **96**: 775 (March 7) 1931; Automatic Environmental Vaccination, ibid., March 14, p. 866; Phylogenetic Immunologic Recapitulation? ibid., March 21, p. 950; Upsetting Immunologic Tenets, ibid., April 11, p. 1232.
6. Schultz, E. W., and Gebhardt, L. P.: Proc. Soc. Exper. Biol. & Med. **28**: 409 (Jan.) 1931.

the quantitative determination of the carrier rate in poliomyelitis. It is therefore only by the inclusion of a number of diseases that one can gain data on all aspects of the question of adult immunization. By taking advantage of the fact that some one disease of the group offers fairly complete data on some aspect of the problem, I believe that a consideration of the group offers fairly conclusive evidence that adult immunity, whether accompanied by any recognizable manifestations of the disease or not, is a specific acquired immunity and not a maturation phenomenon.

The following considerations are submitted in support of this statement:

1. Experimental immunity has been produced only by the particular disease virus, or its toxin, and has never been produced in any other way.

2. Immunity develops only under circumstances in which association with the virus is possible, and it is absent when the presence of the virus can be definitely excluded. Thus the age distribution of measles in the Faroe Islands in 1846 showed clearly an absence of immunity in persons under 65 years of age in a population known to have been entirely free of the disease for sixty-five years. Similarly, evidence of immunity to yellow fever has been found in a relatively large proportion of the population in southwestern Nigeria, the majority of whom gave no history of previous yellow fever. This extensive immunity to yellow fever has been definitely shown to occur only in endemic areas and is absent in persons who have never resided in the endemic area.

The often quoted prevalence of immunity to diphtheria in certain Eskimo populations has been heralded as an example of the development of immunity in the absence of the diphtheria bacillus.[7] However, the evidence for the absence of the diphtheria bacillus is inconclusive, being based on a single examination of some 200 healthy persons in which no carriers were found. It should be pointed out that in this single observation on such a small group of individuals the finding of even a single carrier, as will be shown later, would have sufficed to account for the immunity existing in this population. It does not necessarily follow that a population previously immunized must harbor the bacillus at the particular time the study was made. Indeed, it was noted at the time that a few years previously clinical cases of diphtheria had occurred in this population. I therefore feel that, in spite of the fact that the diphtheria bacillus was not found on a single visit, it cannot be affirmed that the diphtheria bacillus had been constantly absent from this Eskimo population. Thus we have evidence that immunity develops only when there is association with the virus in question and definitely does not develop when the presence of the virus can be definitely ruled out. None of the editorials mentioned which argue for maturation immunity have taken into consideration this statistical association between immunity and the presence of the virus in question.

3. The development of immunity follows laws of infection and does not follow any law of maturation. As pointed out, it does not occur when the virus is absent. In areas in which the virus is present, it varies in accordance with variations in opportunities for exposure. Thus, while in a general way it increases with age, this varies with the concentration of population in a manner consistent with variation in opportunities for exposure and inconsistent with any law of maturation. That development of subclinical immunity in diphtheria and poliomyelitis follows laws of infection is strikingly emphasized when the rapidity with which it develops with reference to concentration of population is compared with that of clinical immunity to measles, in which disease immunity is always associated with unquestioned infection with the virus.

4. In the case of diphtheria, ample evidence is available to show that the distribution of this organism is of sufficient extent to account for the observed adult immunity to diphtheria. It can be figured from the average carrier rate and the average duration of the carriage that by any given age the proportion of the population exposed would equal the proportion who have become immune.[8] In the case of poliomyelitis, no statistical data are available concerning the carrier rate. However, in view of the difficulties in the technic available and the relatively small number of attempts that have been made to detect these carriers, the occasional finding of the virus in the nasal secretions of healthly persons might well be indicative of a carrier rate equal to that of diphtheria and hence sufficient to explain the immunization of practically 90 per cent of urban individuals by the time they have reached adult age.

DURATION OF IMMUNITY

If the phenomenon of adult immunity is attributed to exposure to virus, it must be implied that immunity from the initial exposure tends to be permanent or that a more or less temporary immunity is reinforced by subsequent exposure often enough to maintain the accumulated immunity observed with increase in age.

It has been shown in several instances that immunization to yellow fever lasts for many years in individuals in whom the possibility of reinforcement of the initial immunity by subsequent exposure can be definitely excluded.[2] On the other hand, experimental immunity in general tends to be temporary and can be maintained only by subsequent "exposures" to virus.

While in different diseases there may be considerable variation in this respect, from the fact that the known distribution of the organism of diphtheria is not only sufficient to account for the increase in the proportion of immunes with increase in age but is ample also to account for the continual reinforcement of immunity by reexposure. One is led to believe that reexposure may be an important factor in the maintenance of adult immunity. This probability is emphasized by the suggestion of some loss of adult immunity in later life corresponding with a period of diminishing chance of exposure, as shown by Chapin in a diminishing attack rate among nonimmune persons. From the observations in diphtheria, which are fortunately fairly complete, it would appear probable that the same mechanism is involved in other contact diseases in which a similar adult immunity is encountered.

From the consideration of a number of diseases, each one of which represents particularly well one or another element involved in adult immunity, one is led to believe that what has been called panimmunity is evidence of paninfection. In the case of those panimmunizing infectious agents which are transmitted by person to person contact it would appear that the host-parasite relationship represents a type of parasitism so well adapted to ordinary and irreducible human contact that

7. Bay-Schmith, E.: Klin. Wchnschr. **8**: 974 (May 21) 1929. Heinbecker, Peter; and Irvine-Jones, Edith I. M.: J. Immunol. **15**: 395 (Sept.) 1928.

8. Aycock, W. L., and Kramer, S. D.: J. Prev. Med. **4**: 189 (May) 1930.

there is little hope of bacteriologic control of such diseases, i. e., checking the spread of such a virus.

The effectiveness of artificial immunization is, of course, apparent in diseases in which there is no subclinical immunization, i. e., in which initial exposure and immunization is invariably accompanied by an attack of the disease, as for example measles and smallpox; but in those diseases in which immunization without disease occurs in the preponderant majority of individuals on initial exposure, the practicability of immunologic control would likewise appear to be doubtful.

The correctness of the idea that panimmunity to such diseases has its origin in the disease virus would point to the search for some circumstance other than mere exposure to the virus as the cause of these diseases. In the case of poliomyelitis, evidence has been presented elsewhere [9] which suggests that some discrepancy in physiologic adaption to climate and season may be a major factor in determining disease rather than subclinical immunization on initial exposure to this virus. This would point to studies aiming toward what I have called autarceologic rather than toward bacteriologic or immunologic control of this disease.

PRINCIPLES OF DIAGNOSIS AND TREATMENT OF ALLERGIC DISEASES *

ARTHUR F. COCA, M.D.
NEW YORK

By way of introduction to the stated topic of this discussion, it will be convenient to state, as a general basis, the sense in which I should like to use the term allergy and also the classification of the conditions included under it. I intend to use the term allergy in its current medical sense; namely, the diseases of hypersensitiveness in the human being. This arbitrary definition excludes the experimental hypersensitiveness in the lower animal; that is, anaphylaxis.

The allergic diseases of the human being can be tentatively grouped under the headings serum disease, contact dermatitis and atopy. I do not need to define the term serum disease, with which all are well acquainted. By contact dermatitis I mean a dermatitis due to surface contact with the excitant, typified by the condition formerly known as dermatitis venenata. The known excitants of this condition have been found to be nonantigens (for example, the oleoresin of poison ivy, sumac and primrose). No antibodies have been demonstrated in dermatitis venenata.

Since this sensitivity can be demonstrated or induced in a large percentage of human beings (poison ivy, 72 per cent, H. W. Straus; primulin, 100 per cent, B. Bloch), a special hereditary influence cannot be assumed.

By atopy is meant a group of clinical conditions (bronchial asthma, hay-fever, eczema, gastro-intestinal hypersensitiveness and others), which affect a relatively small proportion of the population, about 7 per cent according to Cooke and his co-workers, and which have been shown to be subject strictly to a mendelian hereditary influence. The excitants of this form of hypersensitiveness are usually water-soluble antigens, and when the excitant is an antigen, specific antibodies are regularly demonstrable in the blood with the use of the technic of Prausnitz and Küstner. This technic is as follows: a small amount of serum of the patient (0.05 cc. is sufficient) is injected intracutaneously in the external aspect of the upper arm. After the irritation has subsided, a solution of the suspected excitant is injected intracutaneously in a quantity of about 0.02 cc. At the same time, a control test is made of the same solution in the normal skin. If, after ten or fifteen minutes, the reaction (wheal or erythema or both) in the prepared site is greater than that in the controlled site, the result is taken as a demonstration of sensitizing antibodies in the patient's blood.

The diagnosis of allergic disease must be made in two steps. It is necessary, first, to determine whether the exhibited symptoms are actually those of hypersensitiveness and, secondly, if possible, to determine the particular exciting cause or causes of the symptoms.

The usual symptoms of allergy are familiar; they include those of hay-fever, asthma, eczema, urticaria, angioneurotic edema, various gastro-intestinal symptoms such as pain, nausea, vomiting, diarrhea, migraine and the skin lesions of what was formerly called dermatitis venenata but is now being referred to as contact dermatitis. Less common symptoms of allergy are those of bladder pain (described by Duke), canker sores of the mouth, essential hematuria, and edema of the retina. It seems possible that there are other symptoms of allergic disease that have not been recognized as such.

The recognition of the allergic nature of any of these symptoms, some of which can be due to other causes, may be facilitated if a definite material is suspected as the exciting cause, and the first test can often be made by having the patient swallow or inhale the suspected material or by otherwise coming in contact with it. Naturally the physician must have in mind the dangers attending this method.

It is a fortunate circumstance that in many instances of allergic disease the skin possesses a specific reactivity to the exciting agent. It is an important fact, which is not generally known, that the reactivity of the skin differs constantly in three categories of allergic disease.

In the atopic or inherited group, the skin exhibits a fairly constant and characteristic reactivity (wheal formation) to the introduction of the excitant into the superficial layers through an abrasion (scratch) or by injection. This reactivity has been shown always to be due to the presence of specific antibodies (atopic reagins) which can be demonstrated in the blood of the individual by means of the Prausnitz-Küstner experiment.

When ever the skin fails to react to a properly prepared test fluid, no reagins can be demonstrated in the blood.

Some asthmatic subjects react negatively to all known excitants of asthma. The hereditary influence in these individuals has recently been shown by Cooke to be as strong as it is in asthmatic subjects giving positive skin reactions. The cause of the asthma in these persons is sometimes found to be the probably nonspecific effect of some infection of the upper respiratory tract.

It is seen that in this group of asthmatic persons even the negative result of all the tests is of some value in the diagnosis, in that it directs the physician's attention to the upper respiratory passages and sinuses as the possible source of the trouble.

9. Aycock, W. L.: J. Prev. Med. 3: 245 (May) 1929.

* From Cornell University Medical College and the New York Hospital.

* Read before the Section on Pathology and Physiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931

The controversy that has been going on as to the relative merits of the scratch and intracutaneous technic is a matter of common knowledge. The differences in the results obtained with the two methods can, I believe, be almost eliminated, first by the use of proper extracts in both cases as well as a proper technic. It has been said that the intracutaneous method causes more nonspecific reactions than does the scratch method, but this would not be true if the intracutaneous test were always properly applied. The nonspecific reactions resulting from the intracutaneous method are usually due to the injection of too large a volume of the extract and they can almost always be avoided if the injected volume does not exceed 0.02 cc.

The scratch method, on the other hand, sometimes fails when the intracutaneous test is successful, and the cause of this failure usually lies in the relative inactivity of the material used for the scratch test. If the extract contains the specific excitant in sufficient concentration, that is, many times that used for the injection test, the results of the two tests will be practically the same.

There is a second group of allergic diseases in which the cutaneous reaction to the known excitant is regularly negative. This comprises the urticarias and angioneurotic edemas occurring without involvement of mucous membranes (for example, nasal, bronchial or gastrointestinal). In such subjects, the known excitant causes no specific reaction when injected into the skin. The extract is not at fault in these instances, for if the same material happens to be the exciting cause of asthma in another person the cutaneous test in that person with the same extract will result positively.

The disadvantage at which the physician is placed by the failure of this group of allergic individuals to react specifically to the cutaneous test with the excitant can be to some extent offset by the use of the feeding experiment, with which the offending food can often be identified. The feeding test, however, sometimes fails when the physiologic reaction is so delayed that it cannot with certainty be referred to the particular food under investigation. Warren T. Vaughan, in his illuminating study of migraine, reports that the cutaneous reactions in this group of cases were often delayed for some hours and he suggests that this delayed reaction was characteristic of that condition.

In a third group of allergic conditions, that known as contact dermatitis, both the intracutaneous and scratch tests with the known excitant result negatively, but the typical lesion can be reproduced by surface application of the extract (for example, that of poison ivy).

The list of excitants of contact dermatitis is constantly growing. It includes a number of materials which contain the excitants of hay-fever and asthma, such as pollens and other vegetable substances, and naturally it has been generally assumed that the excitant of the two categories of hypersensitiveness was the same in all materials. Recent studies by Brown, Milford and Coca have shown this not to be the case with pollen.

The excitant of hay-fever in pollen is a water-soluble antigenic substance. When this substance is freed from the pollen oil, it is incapable of producing dermatitis when applied to the skin surface. On the other hand, the pollen oil freed from the excitant of hay-fever has been found capable on surface application of producing the typical lesion of contact dermatitis.

Bengtson has shown that pollen dermatitis affects persons that are not subject to hay-fever. In fact, the proportion of sensitive persons among the hay-fever subjects is the same, according to Brown, Milford and Coca, as that among those not affected by hay-fever. In all respects, therefore, the pollen dermatitis can be identified with the group of allergic conditions formerly known as dermatitis venenata but now generally referred to as contact dermatitis.

The line of separation between the inherited group of hypersensitiveness designated with the term atopy, and embracing bronchial asthma, hay-fever, eczema, gastro-intestinal allergy and others, and the group of contact dermatitis is thus clearly maintained. In the case of pollen dermatitis, the excitants are different, the one being an antigen soluble in water, the other a nonantigen soluble in fat solvents. The technic of skin testing is different in the two, one requiring absorption through an abrasion in the skin, the other requiring surface application; the one is subject to the atopic hereditary influence and the other is not.

The importance of surface testing in pollen dermatitis was first pointed out, I believe, in the recent papers by Sulzberger and Wise.

These observations also indicate the proper course of treatment of contact dermatitis, that is, by the injection of the oil of the pollen instead of the aqueous extract.

The results point the way also to the proper method of diagnosis and treatment of all dermatitis due to external contact with various excitants. Finally, the results confirm the distinction made in the etiology and mechanism of the inherited eczema and contact dermatitis.

The methods of diagnosis through skin testing have come into a certain disrepute, especially, I believe, among dermatologists. The reasons for this seem to be:

1. Heretofore the dermatologists and some allergists also have not been aware that the usual methods of cutaneous testing (by abrasion and by injection) with aqueous extracts cannot be used in most cases of contact dermatitis.

2. Even in eczema, in which the excitant is water-soluble, the skin test may result negatively either because the extract had been improperly made or because, in the particular case, the excitant of the eczema was not a specific but a nonspecific one affecting the abnormally susceptible skin.

These methods, it is true, are subject to limitations; however, the experienced allergist is aware of those limitations and is constantly seeking ways of overcoming some of them. The experiments of Brown and Milford, which have just been referred to, have provided important information in this direction.

TREATMENT OF ALLERGIC DISEASE

The ideal treatment of allergic disease is the avoidance of the specific excitant when such exists. In not a few instances the exciting cause is not a specific one but an infection, the removal of which sometimes is followed by a cessation of the allergic symptoms.

When the excitant is a specific one which cannot be avoided, as in hay-fever and in some instances of bronchial asthma, resort is had to a procedure that has been incorrectly considered as identical with desensitization in anaphylaxis.

The two procedures are different in the following two ways:

Desensitization in anaphylaxis can be established in a short time (less than twenty-four hours) and is always due to a reduction of the quantity of antibodies in the animal by specific neutralization with the antigen.

The tolerance which can be induced in the allergic human being by injections of the specific excitant usually requires a relatively long time for its establishment (weeks of repeated injections) and is never accompanied by a dimunition of the antibodies (reagins) but often by an increase.

Since this tolerance does not depend on any change in the specific antibodies, it must be due to some alteration of the shock tissue in which the allergic reaction occurs; and one should expect such alteration to be a nonspecific one. However, Aaron Brown has shown that the tolerance is actually specific by demonstrating that, if a hay-fever subject is sensitive to two pollens (for example, grass and ragweed) and is rendered clinically insensitive to one of them, the sensitiveness to the other pollen remains. We are thus obliged to assume a specific tissue desensitization which heretofore has had no analogy in experimental immunology.

Such an analogy has recently been revealed in a study of anaphylaxis in the rabbit by my associate Ella F. Grove, who has been able, by subcutaneous injections of the antigen into sensitized rabbits, to render them insensitive to intravenous injection although the blood of these animals contained ample quantities of sensitizing antibodies. She has shown that this state of tolerance is specific.

8 West Sixteenth Street.

THE RÔLE OF HUMORAL ELEMENTS IN IMMUNITY*

JOHN A. KOLMER, M.D.
Professor of Pathology and Bacteriology, University of Pennsylvania Graduate School of Medicine; Professor of Immunology and Chemotherapy, Temple University School of Medicine
PHILADELPHIA

Before delving into the subjects of humoral elements or antibodies in relation to immunity and their rôle in the diagnosis and treatment of disease, it is fitting to make at least brief reference to newer concepts of their origin and to express deep appreciation of the efforts of those endeavoring to throw off the shackles of theory and tradition and attempt the solution of immunologic problems by the newer methods of physical and biologic chemistry.

Immunology has shown and continues to show so many paradoxes that there is a growing appreciation of the fact that there must be something radically wrong with our time honored basic conceptions and especially with the Ehrlich side-chain theory of immunity, which has dominated thought and research in this field for over three decades. For example, one may mention the fact that the presence or absence of demonstrable antibodies in the test tube may have no apparent relationship to immunity or its absence in the living animal; also that bacterial allergy may not be an index of resistance when one remembers the almost complete absence of correlation between allergy and resistance to tuberculosis and other bacterial infections, including the fact that guinea-pigs possessing antitoxic immunity to diphtheria may yet perish on the injection of a minute dose of diphtheria toxin as a result of toxin hypersensitiveness.

THE NATURE OF ANTIGENS IN RELATION TO HUMORAL IMMUNITY

In the first place, while there is no challenge of the fact that antigens or substances engendering antibody production are protein molecules, yet the newer work of Landsteiner, Avery, Wells and others has indicated that the protein molecule may carry submolecular lipoids or polysaccharides designated as "determinants," which may cause the production of different antibodies and play an important rôle in the mechanism of antigen-antibody reactions in the test tube.

A prevailing thought in chemotherapy is that a chemical compound, such as arsphenamine, does not destroy an organism in the form in which it is administered, but that it first combines with some constituent of the blood or other tissue with the formation of a new compound possessing parasiticidal properties. In like manner, it may be that substances injected or produced in vivo during the course of an infectious disease may combine with plasma proteins, lipoids or other body constituents and the resulting conjugates form the complex antigens responsible for the production of different kinds of antibodies. At least it appears to have been satisfactorily demonstrated that such complex antigens of proteins with lipoids and pneumococcus polysaccharides may be conjugated artificially in the test tube and profoundly alter their specificity.

In this connection, one may surmise that the production of different kinds of humoral antibodies by any one pathogenic organism or other protein substances, such as serum, may be due to their complex chemistry and the chances of possessing or forming in vivo or in vitro numerous submolecular "determinants" having an important relationship to methods employed for the immunization of animals for the production of immune serums and in the preparation of extracts for desensitization in the treatment of human allergies. Also that it may be possible to denature bacterial vaccines during their preparation and thereby lend support to a prevailing idea that vaccines of living bacteria or their unchanged toxins secured by filtration may represent the best vaccinogenic agents.

THE SOURCE AND PRODUCTION OF ANTIBODIES

At present, it is generally surmised that humoral antibodies are produced by cells as the result of stimulation of the latter by antigen; that the antigen may enter into the cell and continue to cause stimulation with the production of antibody over a long period of time and thereby explain why a very small amount of antigen may produce a very large amount of antibody. And, as previously said, it is now apparent that a single antigenic substance may be indeed quite complex, containing several antigens and thereby resulting in the production of different kinds of antibodies. Furthermore, according to this classic point of view, antibodies are in the nature of internal secretions on the part of certain cells, chemically identical in all organs and tissues and of constant chemical constitution.

A newer concept of the production of humoral antibodies, however, is that sponsored by Manwaring, who

* Read before the Section on Pathology and Physiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

regards antibodies as being primary, secondary or even tertiary hybrid protein retention products formed by conjugation or other biochemical interaction between antigens and normal humoral or cellular proteins (colloids). It attempts to explain antibody production on a purely chemical basis in that antibodies are only chemically transformed antigens or specifically altered enzymes (enzymates) derived from the antigen.

If this is correct, diphtheria antitoxin, for example, is merely the toxin of the diphtheria bacillus chemically transformed in the body by conjugation or some kind of interaction with humoral or cellular proteins; that the agglutinin responsible for the Widal reaction in typhoid is merely a transformation of one of the several antigens contained in the typhoid bacillus; and so on.

The idea is not exactly a new one, as one of the original ideas regarding the source of diphtheria antitoxin was based on the assumption that it was transformed toxin but was abandoned by Buchner and Ehrlich when it was shown that the production of antitoxin was altogether out of proportion to the amount of toxin injected into horses or other of the lower animals. And I believe that this is still the main stumbling block to acceptance of the theory that antibodies are chemically transformed antigens, unless future investigations show that such antigens as the toxins, dead bacteria and other antigenic substances can undergo some kind of increase in the body after injection and thereby produce the large amount of matrix required for the production of antibody out of all proportion to the original amounts of antigen.

It is true that Buchner thought at one time that acquired immunity was due to the retention of microbic products or their derivatives. Ehrlich accepted this view but thought that they entered cells and not only produced the primary injury resulting in initial antibody production but also continued to reside in the cell for some time and even for the remainder of life and thereby continued to stimulate the cell into antibody production over long periods of time.

But it may be that microbic products may be retained in the body over long periods without apparent injury and undergo constant chemical transformation into antibodies; the survival of cowpox and other viruses during the long period of immunity suggests this possibility. But the production of extraordinarily large amounts of antibody from relatively small amounts of such substances as toxins, which apparently cannot undergo an increase in the body like a living organism or virus, is a real objection to acceptance of the theory of antibodies being chemically transformed antigens.

However, it is an extremely interesting theory deserving of investigation, and indeed a few observers already claim that they have succeeded in producing artificially in the test tube such antibodies as diphtheria antitoxin, plant and animal precipitins and agglutinins and bactericidal substances for the gonococcus, even though poor Dr. Arrowsmith failed to do so!

THE RÔLE OF HUMORAL ANTIBODIES TO IMMUNITY

That some of the humoral antibodies bear an important relationship to natural and acquired immunity cannot be questioned, especially in the case of the antitoxins and opsonins. Others, such as the agglutinins and precipitins, appear to be likewise vitally involved in the mechanism of lysis and phagocytosis. It is true, however, that the antitoxins appear to be of most importance in serum therapy and that opsonins constitute the chief type of antibody in antibacterial serums and immunity.

There is some more or less definite relationship betwen the neutralization of toxins in the test tube by antitoxins and the prophylactic and curative activity of the latter in the living animal. At least I do not know of any antitoxic serum entirely devoid of the power of neutralizing homologous toxin in vitro, although it is claimed that normal serum free of antitoxin may have some curative effects in diphtheria, probably by a mechanism of nonspecific protein therapy. Furthermore, there appears to be some relationship betwen the opsonic activity of a serum in the test tube and its curative power in the animal and especially by injection into the subthecal space in the treatment of meningitis.

But otherwise it would appear that antibody reactions in the test tube bear no essential relation to defensive antibodies or hormones in the prophylaxis and treatment of disease. As shown by Stillman and others, for example, an antipneumococcus serum may agglutinate the homologous pneumococcus in the test tube but fail to protect mice against the organism. Or it may fail to agglutinate the organism in the test tube and yet demonstrate a high protective power in the animal. As previously stated, it may be that new knowledge of antigens and "determinants" may open up newer and better methods for the immunization of animals with the production of more potent protective types of antibody so essential for the prophylaxis and treatment of disease entirely apart or independent of antibody action in the test tube. At least it would appear that antibody action in vitro is not a safe criterion of the possible prophylactic or curative activities of a serum in the living animal and bearing an analogy in this regard to the very limited value of bactericidal tests in the test tube by chemical agents in relation to chemotherapy.

Furthermore, it would appear that the complement-fixing antibody bears no relationship to resistance or immunity but is merely an index or measure of the degree of infection. In syphilis, for example, one commonly finds the largest amounts of Wassermann antibody in the progressive stages of the disease, whereas, if this antibody were protective or curative, the largest amounts should be found in the clinically inactive stages of apparent latency. And apparently the same is true of other complement-fixing antibodies as for the gonococcus, tubercle and typhoid bacillus.

At present it is simply impossible, at least for me, to define clearly the relationship, or lack of it, of allergic antibody to the processes of immunity. Since the cellular mechanism of allergy is now so well proved as to be practically removed from the category of theory, one is tempted to postulate that allergy is due to antibody attached to cells and that immunity is due to the same antibody free in the humors of the body. But this generalization is not permissible according to present day data. In hypersensitiveness to diphtheria toxin, for example, it is stated that a guinea-pig may have antitoxin in its blood and yet possess toxin hypersensitiveness, and it has been apparently impossible to correlate the phenomena of hypersensitiveness and immunity in tuberculosis. Allergic antibody may be in the nature of a precipitin, but about all that may be definitely stated of it at present is that it may or may not coexist in the blood with protective antibody.

THE RÔLE OF ANTIBODIES IN SERUM DIAGNOSIS

While test tube antigen-antibody reactions are of limited value and may even constitute a hazard in evaluating serums for the prophylaxis and treatment of disease, some of them possess a great deal of value in the diagnosis of disease.

In this connection it must be stated, however, that the term "antigen" is not well chosen, since the substance with which the antibody may react in the test tube may not be capable of producing antibody in the living animal. No better example of this can be given than the alcoholic extracts of normal tissues employed as "antigen" in the conduct of the complement fixation and precipitation tests for syphilis. Indeed, from the chemical standpoint, it would appear that protein-free lipoids may act as "antigens" or "haptenes" (Landsteiner) in the test tube and be entirely devoid of demonstrable antigenic activity in vivo.

On the other hand, however, some of these nonspecific test tube antigens may be capable of producing antibody. I refer to the lipoid-protein complexes from the tissues of the guinea-pig and many other substances capable of producing antisheep hemolysin when injected into rabbits and constituting what Forssman and others have designated as "heterophile" antigens and antibodies. Indeed, the discovery of these constitutes another and very perplexing paradox in immunity and an additional example of the complex chemistry of antigens in relation not only to test tube reactions but to antibody production as well.

Curiously, the very antibodies of apparently limited value in natural and acquired immunity are of most value in serum diagnosis. I refer especially to the agglutinins, precipitins, complement fixing and allergic antibodies. It is true that the methods employed for serum diagnosis usually contain sources of technical error and that the possibility of certain biologic errors may be present; but these are now fairly well understood, so that agglutination tests for example are of proved value in the diagnosis of typhoid, paratyphoid and undulant fevers as well as of tularemia, glanders and other bacterial diseases of man and the lower animals. In this connection I may also refer to other paradoxical situations with especial reference to the mysterious and unknown origin of the agglutinin for *B. proteus-vulgarus* (X 19) in typhus fever (Weil-Felix reaction) and the Hektoen phenomenon, which refers to the production of typhoid agglutinin in influenza, undulant fever or some other acute infections. These, too, appear to be nonspecific biologic reactions urgently requiring elucidation.

Furthermore, precipitins are of value in the detection of anaphylaxis as well as for the differentiation of blood, serums, bacterial and other proteins, while the precipitation and complement-fixation tests for syphilis constitute in all probability the most useful of all serodiagnostic methods.

2101 Pine Street

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. GAY, AYCOCK, COCA AND KOLMER

DR. M. B. SULZBERGER, New York: As a dermatologist I have naturally had much occasion to occupy myself with drug eruptions; that is, allergic skin eruptions due to sensitization to drugs. The drugs which sensitize are usually very simple chemicals. That is, they are sometimes even elements such as arsenic and mercury, and are often well known chemical substances such as paraphenylenediamine and arsphenamine. Although these are not full antigens or functional antigens, they satisfy some of the requirements in the definition of an antigen. That is, the first contact with them, or a contact with them, if not the first, sensitizes and causes the cells to react differently on subsequent contact. This is one of the definitions of an antigen (partial antigen). Unfortunately, I have never been able to demonstrate antibodies satisfactorily to these simple partial antigens, or sensitizing bodies. It would be a great advantage if one could demonstrate serologic and immunologic substances reacting in a specific manner to these simple chemical compounds. If this were possible, the study of immunologic phenomena would be materially advanced, for one would not be dealing with complex substances of unknown chemical nature, and such questions as to whether an antibody is formed from antigen or uses antigen in its formation could perhaps be easily solved. That antibodies to these simple substances have not been demonstrated does not mean that it will be impossible to do so. I know Dr. Coca's work very well. I have followed it for a long time with great interest. He has ventured on a dermatologic field this afternoon, and I agree with him, in the main, that there are certain types of allergic skin eruptions which have a hereditary predisposition, that is, in which the susceptibility to sensitization is hereditary, and that these are frequently combined with asthma and hay fever and also often give positive skin reactions to intradermal testing or scratch testing. I do not think that these eruptions should be called eczemas. There is another dermatologic name for them—that is, generalized neurodermite or lichen simplex disseminatus. I think it would be confusing to call them eczemas and I fear that many allergists and even dermatologists use this term too loosely. Eczema is today practically synonymous with contact dermatitis. In this condition the patch tests must be employed. It is interesting to note that some cases of pollen contact dermatitis are caused by fat-soluble substances, if I understood correctly. There are, however, many examples of contact dermatitis in which this is not the case. There is contact dermatitis due to quinine, due to corrosive mercuric chloride, due to solution of formaldehyde, due to phenylhydrazine—and I could keep on with this list ad infinitum.

PLASTIC OPERATION TO RESTORE VOLUNTARY ANAL CONTROL*

HARVEY B. STONE, M.D.
BALTIMORE

There are many conditions which, although not menacing to life or even to ordinary good health, are extremely distressing to the individual in the discomfort and disturbance of function and the general wretchedness which they cause. In this group of disorders perhaps none is more completely harassing than incontinence of anal control. Various conditions may result in loss of control of the sphincter ani muscle. Direct injury to the muscle itself from accident or operation, damage to its nerve supply anywhere along the course of the fibers from the cerebral cortex to the end-organs in the muscle, and certain congenital defects from which either the muscle or its nerve supply is defective are the principal types of lesions which result in incontinence of feces. For some of these conditions, efforts have been made in the past to repair the damaged muscle by suture or plastic operations of various sorts. Others have been frankly regarded as beyond help. The plastic operations on the muscle frequently have given unsatisfactory results. The field is one in which improvement in the methods at present in vogue should be widely welcomed.

In articles published about two years ago by Wreden [1] and by me,[2] there was described a new method of

* Read before the Section on Surgery, General and Abdominal, at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

1. Wreden, R. R.: Method of Reconstructing Voluntary Sphincter Ani, Arch. Surg. **18**: 841 (March) 1929.
2. Stone, H. B.: Plastic Operation for Anal Incontinence, Arch. Surg. **18**: 845 (March) 1929.

restitution of anal control, following damage or loss of the sphincter muscle. At that time Wreden reported one successful case and I also reported one successful as well as one unsuccessful case, and since then Ransohoff [3] has reported an additional success by his method. My purpose in this paper is to record seven further cases, again to call attention to this valuable principle of treatment in a most discouraging situation, and to introduce some further modifications of technic that seem to be improvements. The essential principle of Wreden's operation is to harness the two gluteus maximus muscles by slings of fascia that pass around the anal canal, in such a manner that, when the glutei contract, these fascial slings will be drawn taut. As the slings from the two sides interlock, this tightening closes the anal canal and gives the patient a voluntary control over the closure of the lower end of the bowel.

The case reports, condensed to essentials, are as follows:

CASE 1.—Mrs. E. M., a white woman, aged 44, complained of diarrhea and incontinence of feces. This patient has a long surgical history of twelve operations, including among others removal of ruptured appendix, removal of gallbladder, cesarean section, hysterectomy, perineal repair and several rectal operations. Three years previous to her admission to the Church Home and Infirmary for the present illness, the sphincter muscle had been divided for an ulceration of the rectum. Since that time she had had no control over the bowels in spite of two or three attempts at a repair of the sphincter. Eighteen months ago she developed diarrhea with from twenty to forty stools daily. No parasites were found on repeated search and no ulceration was seen. The condition was diagnosed as mucous colitis.

On examination the patient was found to be highly nervous. There were multiple scars and a very annoying mucous colitis. The anal outlet was patulous and showed a good deal of scarring. On palpation no sphincter tone whatever could be felt, and when the patient was asked to contract the anal outlet voluntarily, no visible contraction took place.

Oct. 18, 1929, operation was done as described in a previous article, except that a piece of fascia from the patient's own thigh was used to form the strips. The wound became infected to a considerable extent and some of the fascia sloughed out. It finally healed, and the patient was discharged six weeks after operation. At this time the mucous colitis was greatly improved and there was distinct contracting power in the anal canal when the gluteus muscles were tightened. A report one year later showed some improvement over her previous condition, but her control was still far from perfect. This case can be classed, at best, merely as one of improvement.

CASE 2.—L. de G., a white girl, aged 16, had a spina bifida with paralysis of many of the muscles in both legs below the knee, with pes equinocavus and with rectal and bladder incontinence. This situation had existed since birth and was clearly due to a developmental fault in the lower spine, with extensive nerve disturbance.

Operation was performed, Jan. 14, 1930, at the Church Home and Infirmary; the strips were of prepared fascia in this instance and not autogenous. The wound healed practically by first intention except for a slight serous drainage. The patient was discharged, January 28, and at the time of discharge the result of the operation was considered to be very good. She has been seen since that time and, as she has learned better to utilize the gluteus muscles, her improvement has continued. At the present time the patient herself considers the result to be practically perfect.

CASE 3.—H. H., a white man, aged 63, was operated on at the Church Home and Infirmary in September, 1928, for a very extensive fistula in ano. In the course of this operation it was necessary to divide the sphincter muscle. The fistula healed, but following recovery from the operation there was considerable incontinence but no complete loss of anal control. This weakness of control was quite annoying, particularly as the patient had also a mucous colitis of some years' standing and was unable to retain mucous stools at times.

He was operated on, March 25, 1930, and the prepared fascia was used for the strips. The patient was discharged, April 7, the wound having healed practically by first intention, there being only a slight amount of serous drainage. He was greatly improved. He was seen again three months later and the result was very satisfactory but not quite perfect. The only difficulty that the patient has is that there is some slight seepage of moisture unless he is careful to keep the glutei tense at times. This occurs only when one of the mucous bowel movements is present in the rectum. He has no difficulty controlling the actual stool and no difficulty with gas.

CASE 4.—Mrs. J. O., a white woman, aged 37, was admitted to the Union Memorial Hospital, March 16, 1930, with a diagnosis of ovarian cyst and uterine myomas, also relaxed sphincter ani. She was operated on, April 2, the uterus and the right adnexa being removed. Convalescence from this operation was satisfactory and on April 19 it was decided to attempt one of the plastic fascia strip operations for the anal incontinence. This incontinence followed forceps delivery in 1912, and she had an attempt made in 1913 to repair the damage by the usual plastic operation on the perineum. This was unsuccessful. A second unsuccessful attempt at sphincter repair was made in 1921. Her incontinence had continued without improvement and had recently become worse. The operation, April 19, was performed by Dr. J. Arthur Weinberg, at that time resident surgeon of the Union Memorial Hospital. Following the operation the wounds became slightly infected and drained for two or three weeks before finally closing up. There was also some sloughing of the distal end of the rectal mucosa, which was probably due to some strangulation by the bands of fascia. The patient was discharged from the hospital, May 11, entirely healed, and had good control of bowel movements but not complete control of gas. The sphincter at that time admitted the index finger. She was reexamined, October 24, at which time it was noted that the sphincter tone was good. The sphincter admitted the index finger. The wounds were entirely healed. The patient had complete control except when she became very nervous and excited. The bowels moved regularly, and there was no soiling whatever. The result was considered perfect.

CASE 5.—C. B., a white man, aged 32, had been operated on in 1928 and again in 1929 for rectal fistula. Since that time he had been troubled with discharge and itching about the anus and was unable to control his bowel movements after taking laxative medicine. The patient was first given an alcohol injection for the pruritus but returned later complaining of incomplete control of the bowel. On rectal examination there was an inflamed area about the anus and mucoid discharge coming from the rectum. The rectal sphincter was relaxed and he apparently had very little control of it. Operation, March 4, 1930, at the Church Home and Infirmary was performed by Dr. Ervin B. Wallace, at that time resident surgeon at the Church Home. The material used for the strips was prepared fascia. The patient made an uneventful recovery with healing of his wounds by first intention. The discharge from the rectum was considerably lessened. Sphincter control improved so much that the patient could now hold an enema. He was discharged from the hospital in two weeks and was seen again in the middle of October, six months after his operation. He still had some pruritus in the skin about the anus, but the sphincter was working perfectly and Dr. Wallace reported an entirely satisfactory result. The patient in this instance was distinctly subnormal mentally, and it was felt that because of his lack of intelligence he did not utilize the gluteus muscles to the best possible advantage.

Through the courtesy of friends I am permitted to record two further cases:

CASE 6 (patient operated on by Dr. G. Paul LaRoque of Richmond, Va., who has kindly furnished the following abstract).—A man, aged 60, who had undergone an operation for fistula in ano thirty-eight years before, complained of total

3. Ransohoff, J. L.: Ann. Surg. **90**: 317 (Aug.) 1929.

incontinence except when obstinately constipated and, for the past fourteen months, of rectal prolapse. Examination showed prolapse 4 inches long and no palpable sphincter at any place. Oct. 4, 1930, an exaggerated Whitehead operation for prolapse was done. October 31, the operation as described by Stone[2] was performed, fascia lata strips from the patient's thigh being used. The wound healed without suppuration. The patient was last seen about four months after operation. He had control of his movements except when he took a purgative, and Dr. LaRoque estimated the result as about 90 per cent satisfactory.

CASE 7 (patient operated on by Dr. Lon Grove of Atlanta, Ga., who furnishes the following data).—A boy, aged 6½ years, presenting anal and bladder incontinence due to spina bifida, had undergone one previous attempt at surgical repair by another operator. Dec. 1, 1930, Dr. Grove employed the method as described in the previous publication by Stone,[2] using autogenous fascial strips from the thigh. The wound healed without infection. Dr. Grove reports that an examination about three and one-half months later showed the child greatly improved but control not quite perfect. If there is diarrhea, control is lost, and at times when the small patient forgets to use his new control there is soiling. As the patient is very young, Dr. Grove expects much more nearly perfect results later when he is older and can cooperate better.

To summarize these seven cases, together with the four others previously reported in the articles already referred to, there have been five very successful cases, four almost entirely successful cases, one case only slightly benefited and one complete failure. In the two unsatisfactory results, infection was much more pronounced than in any of the other cases and was felt to be without doubt the cause of failure. The desire to reduce the probability of infection, in a field where strict aseptic postoperative conditions are well-nigh impossible, has led to the modification of the operation in some details, and at present the following procedure is employed:

With the patient in the lithotomy position, after as careful cleansing of the field as possible, including cleansing enemas for two days previous to operation, two symmetrical incisions are made, one on each side, about 4 cm. lateral to the anal margin and slightly posterior to it. These incisions slant somewhat laterally toward their anterior ends, are about 2 cm. long, and are carried well into the subcutaneous fat. After the two incisions have been made, a closed long curved clamp (Kelly) is introduced through one incision and by blunt dissection is forced around through the subcutaneous tissues in front of the anus, and its tip is made to emerge into the other incision. The clamp is then opened and grasps the ends of two strips of fascia, 0.5 cm. wide and from 22 to 25 cm. long. This fascia may be either autogenous from the patient's fascia lata or prepared by the Koontz method. The clamp grasping the fascia strips is then withdrawn the way it was introduced. This threads both fascia strips in front of the anus. A second Kelly clamp now grasps the end of one of the strips, is passed again into one of the incisions and is forced to burrow its way subcutaneously to the other incision, this time behind the anal canal. As it emerges into the opposite wound, the strip of fascia clamped in its tip is seized and more of it is drawn through the wound. This strip now encircles the anus subcutaneously, entering at one incision and its opposite end emerging from the same incision. The clamp, which meanwhile has remained in its posterior tunnel, is opened, grasps the end of the second fascia strip and is pulled back the way it was pushed in. It brings back with it the end of the second strip of fascia, which now also encircles the anus subcutaneously but in the opposite direction to the first strip, each forming a loop with the free ends of the same strip protruding through the same incision. From one of the incisions blunt dissection is now carried outward and backward fairly deep in the fat until the mesial edge of the gluteus maximus is reached and identified. A bundle of fibers of this muscle about as thick as one's index finger is now surrounded by one end of the fascia strip protruding from the skin incision. This may be done most easily by carrying a linen thread in an aneurysm needle around the muscle bundle and using the thread as a tractor, tied to the end of the fascia strip, to pull the strip around the muscle bundle. This end of the strip is now brought back into the incision and tied tightly to its own other end, thus forming a closed loop, one end of which encircles the anal canal and the other a bundle of gluteus muscle. Exactly the same steps are executed in the other incision with the two ends of the other fascia strip. The knotted fascia ends sink into the depths of the wounds, and the skin is closed as the operator may prefer. The two small incisions are sealed with some impervious dressing, and the bowels are kept tied up for from seven to ten days following the operation.

The anus is now encircled by two loops of fascia running off in opposite directions, tied under some tension about bundles of gluteus muscles. When the glutei are voluntarily contracted, they will pull the loops still tighter and give a mechanism for voluntary increase in closing pressure on the anal canal. As has been said, the principle of this operation is that of Wreden. The method differs from his and from my own first method by reducing the number of incisions from four to two and moving these two farther from the anal orifice. The mechanics of the operation remain the same, but the chance of escaping wound infection is improved. Four of the cases herewith reported, all done by this newer modification, have been very satisfactory. If infection can be avoided, the percentage of good results should be very high.

There are several points of interest in regard to this operation that deserve a further word. The operation depends on the utilization of the gluteus muscles. Hence it is obvious that if these muscles are for any reason not functioning this operation cannot be expected to succeed. Also until the patient learns to use the glutei properly the full benefit is not obtained. Hence education of the patient in this regard is important. He must be trained to contract the buttocks when necessary. It follows that patients who cannot be taught to do this, because of lack of interest or of intelligence, do not improve as much as others. Case 5 of this series was an instance in point. The anatomic and surgical result was excellent, but the patient did not always remember to use his new power of anal control. Because of this necessity for education, the successful cases do not show as much immediate improvement as will ensue ultimately.

SUMMARY

Seven further cases of anal plastic operations are reported and reviewed with four previously recorded cases, with nine good and two poor results. A further modification of the method to secure better protection against infection is described. This operation offers a new principle of attack on a very difficult problem and deserves further trial.

18 West Franklin Street.

ANAL FISTULECTOMY *

LOUIS A. BUIE, M.D.
ROCHESTER, MINN.

It is my purpose to present information based on the records of consecutive cases in which fistulectomy has been performed, and to outline a few principles of value on the surgical treatment of anal fistula. The types of fistulas, the course of the tracts, the preoperative preparation of the patient and the sedatives and anesthesia employed have been described previously [1] and will not be considered here. This study tends to establish the truth of information concerning anal fistulas instead of bringing out any new facts.

It is customary at the Mayo Clinic to perform proctoscopic and sigmoidoscopic examination in all cases in which evidence is disclosed, either in the history or by general examination, of disordered function of the anus, rectum or colon. Approximately 9 per cent of the patients who register at the clinic complain of anal, rectal and colonic disorders. A little more than 5 per cent of these are found to have anal fistulas. Five hundred and eighty-nine (58.9 per cent) of the 1,000 patients in this series were males, and 411 (41.1 per cent) were females. Only one patient was less than 10 years of age, and six were in the second decade of life. Forty-eight and two-tenths per cent were between the ages of 20 and 40, 77.4 per cent between the ages of 20 and 50, and 93.9 per cent between the twentieth and sixtieth years of life.

ETIOLOGY

It is necessary constantly to be aware that tuberculosis may cause anal fistula. It should also be borne in mind that actinomycosis might cause such a lesion, and that malignant growths may develop in anal fistulas. However, it does not seem necessary to regard as of any significance the possibility of involvement of the ischiorectal tissues by abscess or fistula caused by unusual organisms. Although tuberculosis formerly was considered a prominent factor in the production of fistula in ano, it is well known now that it rarely causes this disorder, and a primary tuberculous anal fistula is rarely seen. When studying this series, I tried to discover all possible indications that the patient might have or might have had tuberculosis. I included those patients who gave histories of tuberculosis and some without any other evidence than that of a report of a healed tuberculous lesion in the roentgenogram of the lungs. After eliminating the cases in which there were old healed types of tuberculosis, those in which there were positive histories only, and other cases in which tuberculosis was improbable, I feel that there was a probable causal relationship of tuberculosis to the fistula in only fifty-four cases. I can be sure of such a relationship in only twenty-two cases in which it was possible to demonstrate tuberculosis on examination of tissue, and in five cases in which there was active tuberculosis and in which examinations of tissue gave negative results.

ORIGIN

One of the chief reasons for failure to cure anal fistulas is misconception as to the point of origin of the disease. Lockhart-Mummery,[2] for example, began his paragraph on the causes of fistula in ano as follows: "The primary cause in all cases is an abscess in the tissues surrounding the rectum." It is surprising how many well informed surgeons have the same idea. It is true that ischiorectal abscess is an important part of the process that develops into fistula, but it is by no means the primary cause. The idea that the abscess is the beginning of the disease is probably due to the fact that it is at that time that symptoms are most troublesome, and it is then that the patient finds it necessary to seek aid. Previous to that time he has usually been unaware of any irregularity, although he might have noticed soreness, a sense of fulness, or tenderness about the anus and lower part of the rectum. It seldom happens, therefore, that the surgeon has an opportunity to consider those conditions which are responsible for the actual origin of the fistula until after the abscess has appeared, and many times after it has actually ruptured.

The development of an anal fistula may be divided into four stages, and the abscess does not appear until the third stage. The first stage is that of involvement of the anal crypts. Practically all anal fistulas originate as infection in the crypts of Morgagni. These little pockets are surrounded by lymphoid tissue and are formed by the juncture of the skin with the mucous membrane. The former overlaps the latter in a serrated margin known as the pectinate line (linea dentata) which is made up of the papillae of Morgagni. The crypts are susceptible to the same traumatic influences that attack other portions of the rectal outlet. Anything that produces a break in the tissues about the anal crypts, with subsequent admission of such organisms as Escherichia coli, Proteus vulgaris, staphylococci or streptococci, may result in development of infection of the crypts, and this is capable of developing into fistula. Often the trouble has been started by one or another of the following agencies: the strain and stretching due to the passage of a large, formed stool; the irritation of excessive diarrhea, or the trauma of a fall or of a foreign body, such as a fish bone or chicken bone. Thus the infected crypt becomes edematous, the papilla becomes hypertrophied and adherent over the crypt, and this nidus of infection is the beginning of the fistula.

The second stage is that of burrowing. The infection in the crypt begins to expand, and with its spread the process extends by burrowing out into the tissues adjacent to the anus. There are several courses which these tracts may pursue, but approximately 85 per cent of them pass either through the substance of the external sphincter or internal to it, between it and the internal sphincter. The tract ultimately finds its way into the ischiorectal tissues, where an abscess develops.

The third stage is that of the ischiorectal abscess. After the infection has passed through or between the muscles, the irritation produces a spastic condition of the anal muscles, and, except in those instances in which there is great destruction of muscle fiber, this spasm prevents a return flow of the pus toward the anus. Consequently, there is an accumulation external to the muscles, and the abscess develops in the loose tissues of the buttocks, the ischiorectal space or the pelvis.

In the fourth stage, the abscess increases in size, and, depending on its situation, it may rupture either externally, on the surface of the skin, or into one or more of the pelvic viscera, including the rectum, vagina, urethra, bladder or uterus. Sometimes the patient pre-

* From the Section on Proctology, the Mayo Clinic.

* Read before the Section on Surgery, General and Abdominal, at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

1. Buie, L. A.: The Origin and Treatment of Fistula-in-Ano, S. Clin. North America **7**: 1579-1600 (Dec.) 1927.

2. Lockhart-Mummery, J. P.: Discussion on Fistula-in-Ano, Proc. Roy. Soc. Med. (Sect. Surg., Sub.—Sect. Proct.) **22**: 33-43 (July) 1929.

sents a large swelling about the buttocks, due to such an abscess, and the delay in pointing and rupture necessitates incision. With the appearance of the secondary opening, regardless of its situation, the fistula is complete.

TREATMENT

As has been stated, it is rarely possible for one to give treatment in either of the first two stages of the disease, and it is only after the abscess has formed, and frequently after it has ruptured, that the patient will consult the surgeon. If rupture has not taken place, the abscess should be opened as soon as fluctuation is present. If induration, without fluctuation, persists unduly, hot applications should be used. A large cruciform incision should be made, and the points of the incision should be cut away in such a manner as to leave the external opening as large, if possible, as the cavity of the abscess itself. All cutting or, in the case of fistula, all dissection is done with the knife or scissors. Cauterization is not necessary in fistulectomy, and I have found that tuberculous fistulas heal just as readily as others, even though the cautery is not used. The abscess should not be explored digitally or the cavity irrigated with solutions in the acute period. Either of these maneuvers may result in destruction of the pyogenic wall of the abscess and in consequent systemic reaction which may prove very serious. It is much better to insert a small iodoform gauze drain to the innermost recesses of the abscess cavity and to do nothing more. The more acute the condition the less should be done in excess of wide incision and drainage. It is then advisable to delay fistulectomy, if possible, until the cavity of the abscess has been reduced in size and only a chronic, fibrous, fistulous tract remains. Once in a while, when there is a small abscess with a superficial tract and only a mild reaction in the surrounding tissues, it may be possible, after opening the abscess, to excise the fistulous connection down through the anal crypt and in that way to complete the cure in one operation. This is rarely advisable, however, and it is usually better to operate on the abscess first and on the fistula later.

The misconception in regard to the nature and situation of the internal opening is responsible for practically all the trouble which is experienced in curing the disease. In offering a solution of this problem, I feel that it should be understood that there is a primary and a secondary opening in every fistula. There may be more than one internal opening and there may be more than one external opening, but there is usually only one opening which is the source of the infection responsible for the fistula. This opening is almost always in one of the anal crypts, and usually, when there is another internal opening, it will be found above the pectinate line, somewhere in the wall of the rectum; the opening is secondary, owing to rupture of the abscess at that point.

The first problem is to find the internal opening or the source of the trouble. It is a mistake to seek for this point by immediately probing the sinus tract from the outside. Fistulas burrow through the tissues in a most irregular fashion, and the tracts are frequently angular and multiple. It is impossible, therefore, to probe fistulas in this manner with any degree of accuracy. Many surgeons make use of injection of colored solutions into the external sinus, but it seems to me that I have seen this method result unsatisfactorily more frequently than not. Methylene blue (methylthionine chloride U. S. P.) and bismuth paste are most frequently employed. I seldom use either. It is unnecessary to use colored solution in order to distinguish the tract from the remainder of the tissue, because the fistulous walls have a characteristic appearance which is easily distinguishable from that of normal tissue. If, on the other hand, the solution is being used in order to localize the internal opening, it is easier and more accurate to examine the anal crypts themselves.

One should not attempt to make more than a cursory examination of a fistula without anesthesia, and for this purpose a sacral anesthetic is preferable. The anus should not be dilated previous to the search for the internal opening. It is not wise to break up the tissues around the anal margin, because it may distort the fistulous tract leading from the crypt, or actually rupture it. This makes it difficult to trace the course of the tract from within outward, as it should be done. The anal crypts are examined, and it is possible to judge with a fair degree of accuracy where the internal openings will probably be by noting the position of the external sinus. In the series on which I am basing these remarks, 50 per cent of these openings were in a crypt or crypts situated in the median line of the posterior anal wall, 20.3 per cent of them were in a crypt in the median line of the anterior anal canal, and 29.7 per cent were found in the right or left walls. If the anal canal is divided into an anterior and a posterior half, approximately 70 per cent of fistulas will originate in a diseased crypt in the posterior half of the anus.

There is usually a definite sinus, which can be seen without difficulty. Frequently, pus can be seen coming from behind the pectinate line, and the internal opening is disclosed in that manner. Sometimes a tuft of granulation tissue can be seen within a crypt, and when a probe is inserted into it the sinus is found. On occasions, only a little inflammatory reaction with bleeding on slight trauma is apparent, and rarely all crypts appear normal.

In order to justify the theory that infected anal crypts are the source of anal fistulas, it must be contended that all anal fistulas have internal openings. How is it possible, then, to find crypts of normal appearance with an active fistula in ano? This apparent paradox can be explained. When the abscess has formed and ruptured, the release of pressure and the establishment of a point of discharge makes it theoretically possible for the tract extending from the anus to the abscess to become inactive and fibrous, and actual healing may sometimes result. In this way the crypt could heal, close and, in time, show no apparent evidence of disease. This I believe to be the explanation of the so-called incomplete external fistulas, of which surgeons have been unable to demonstrate an internal opening. Suffice it to say that it is practically always possible to discover the diseased crypt, and in those rare instances in which there does not seem to be any apparent involvement it is usually possible to connect the abscess with the probable point in the anal canal which was responsible for the origin of the disorder. In such instances one is justified in excising one or more of the crypts in the suspected anal quadrant in order to eliminate the dormant tracts. Occasionally, an abscess may occur in the perineum as a result of direct lymphoid involvement originating in an anterior anal crypt. In such instances, a definite tubular tract may not exist, and the infection might have been carried from the anus through the lymphoid chains which extend away from the anal margin. In cases of

this kind, all tissues covering the abscesses should be cut away, and the tissues between the abscess and the superficial anal tissues should be excised down to and including the anterior anal crypt.

When the internal opening is found, an attempt should be made to get the probe into it, and the cutting should be from this point outward, including all the anal sphincters external to the tract and down through the wall of the fistula. Only when it is not possible to accomplish this should incision of the tract be begun externally, with a probe or grooved director in the external sinus. Then the tract should be followed carefully, and ultimately it should all be opened, down through the internal opening. When it is necessary to open the fistula by way of the external sinus, there is a simple rule which will assist in determining the course of the tract. Imagine a straight line drawn between the two tuberosities of the ischium. Such a line usually will pass across the anus near the anterior anal margin. If the external sinus is anterior to this line, the internal opening probably will be in the anterior half of the anus, and a straight, fistulous tract will connect the two openings. If the external sinus is posterior to this line, the internal opening is usually situated in the posterior median line of the anal canal, and the fistulous tract will pass from the external sinus and pursue a curved course posteriorly until it connects with the internal opening in the posterior wall of the anus. If there are many openings, and sinuses are found anterior and posterior to this line, the external sinuses are usually connected by fistulous tracts, and the rule for the posterior opening applies. All fistulous tracts should be opened throughout and all overhanging edges thoroughly cut away. The tracts should be excised unless they extend up into the pelvis or so deeply around the rectum that excision cannot be accomplished without sacrificing too much tissue. When the tracts cannot be excised, they may be mutilated with a curet or sharp instrument in such a way that they may heal with a solid scar. As a matter of fact, if there should be a sinus extending up into the pelvis, it will heal even if left alone, provided the main tract to the source of infection is opened and completely uncovered. When this tract is completely uncovered or excised, the infective discharges from the rectum pass outside and no longer accumulate in the tunneled fistula. Therefore the source of supply of the infected material which kept the pelvic sinus active is cut off; hence the sinus heals.

All fistulous tunnels should be converted into open ditches. If the sinus is connected with an opening higher in the rectum, where an abscess has ruptured, it will be necessary to cut through the rectal wall, along the entire course of the sinus, and leave the wound open.

If there are superficial tracts extending out into the buttocks and the tracts can be excised, it is preferable to suture the distal limbs of these tracts. Suturing, however, should not be carried so close to the anus that there will be pocketing due to overhanging edges, which will admit the discharges from the rectum under the skin of that part of the wound which has been closed. Proper consideration of this feature will save much time in the healing of extensive anal fistulas with many branching sinuses. Complete suturing of the wound through the anal canal seldom produces a satisfactory result, and although an instance occasionally is found in which a wound can be sutured following excision of a small, chronic, fibrous tract, as a rule it is hardly worth while to attempt this means of hastening healing. Operating on fistulas in stages may be used as a matter of expedience, but it is not a necessity. There are hidden tracts which cannot be found at the time of the first operation, and further operative procedures are sometimes necessary. This, however, is rare.

POSTOPERATIVE CARE AND RESULTS OF OPERATION

I now come to the most important consideration, which has to do with muscular control and the function of the anus following fistulectomy. The gauze (usually iodoform) which is placed in the cavity of a wound should not be allowed to remain in position too long. If a wound is packed with iodoform gauze and allowed to remain untouched for a week or ten days, the walls of the wound become organized into a fibrous membrane. Under such circumstances, a cavernous scar results. It then makes little difference how capable the anal sphincters may be; they cannot produce closure of the anal outlet by exerting their pull on the margins of this membranous scar. The gauze, therefore, should be removed early, when the walls of the wound are still raw, so that when they are healing they will come together to form a solid block of scar tissue throughout their entire extent. Then, with healing of the wound at the margin of the anus, there is formed a block, instead of a membrane of scar tissue, and the severed anal muscle fibers grow to it. The pull of these muscles on this block of scar tissue will then close the outlet of the rectum just as efficiently as if the muscle fibers themselves were uninterrupted. I usually succeed in removing all the gauze from the largest wounds within four to five days following the operation. The gauze is out of small wounds within seventy-two hours. In my series, only six patients complained of incontinence, and in all these instances the lack of control was manifested only when the content of the bowel was liquid. Not one of the entire group had incontinence of soft or of solid stools.

Of the 1,000 cases, more than one operation was necessary in 61. In all these, the secondary operation was performed while the patient was under observation at the clinic and before he had left our care. Frequently, only slight operation was necessary, but at other times much more had to be done. Whenever anesthesia was necessary for performance of the operation, it was listed as a secondary operation. One patient came in with multiple abscesses following injection treatment of hemorrhoids, and it was necessary to perform six operations on the abscesses and fistulas before cure was obtained. However, after single operations or after multiple operations when necessary, all patients were ultimately cured, and recurrences have not been reported. Of all the patients, 46.8 per cent had been operated on once previous to admission to the clinic, 14.3 per cent twice, 4.1 per cent three times, 0.8 per cent four times, 0.7 per cent five times, 0.4 per cent six times, 0.4 per cent seven times, 0.1 per cent eight times, 0.2 per cent twelve times, and 0.1 per cent fifteen times.

The length of time necessary for a patient to remain under observation would naturally be expected to vary within wide limits. In some instances, the disease was so extensive and so many operations were necessary that patients were forced to remain under observation for a very long time. The longest period over which I cared for a patient was three months and nineteen days. The average time spent in the hospital was 12.7 days, and the average total time spent under my care was 25.8 days.

The reports from which these statistics have been recorded were not accepted as being of value if the patient had been operated on less than three months previously. In 73.5 per cent of the cases, the record was studied six months or longer after the operation.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. STONE AND BUIE

DR. LON GROVE, Atlanta, Ga.: I think any operative procedure done for this condition, having such wide range of applicability and practically without mortality, deserves the commendation of this association. Nine satisfactory results out of eleven trials, approximately 82 per cent, is certainly better than has been obtained with other technics. The only difficulty is the ability to do the operation without infection, and Dr. Stone has shown that this is possible in the majority of cases. It is rather tedious and time consuming but can be done by the average surgeon. In certain cases with marked relaxation of the anus, I would suggest a preliminary colostomy, followed by prolonged cleansing of the rectum and anus before the plastic operation is attempted. This should reduce the incidence of infection. Dr. Buie said that 9 per cent of patients at the Mayo Clinic have proctoscopic examinations. If he meant to say this, I think the percentage too low. In recent years emphasis has been laid on the necessity of a routine proctoscopic examination. One sees too often patients who have been told that they have bleeding hemorrhoids, who when properly examined are found to have painful fistulas, polypi, or even inoperable malignant tumors. I agree that tuberculosis as a cause of fistula in ano is extremely rare. It is rarely seen even in the Negro, who is notoriously prone to develop tuberculosis. I am surprised that he has seen only one case in a child, because in the Henrietta Eggleston Memorial Hospital, where all children admitted are under 12 years of age, fistula in ano has not been a rare condition. Three cases were seen there last year. I can't emphasize too much what he has said about the two-stage operation. The radical operation should never be done at the time of drainage of the abscess. The sphincters are frequently extensively undermined, and if the fistula operation is done at the time of the primary drainage, one will certainly be embarrassed by postoperative incontinence, due to a retraction of the muscles. I still feel the necessity of packing these wounds but certainly agree with Dr. Buie that the packing should be light, preferably with petrolatum gauze, which should not be left longer than two days.

DR. WALTER A. FANSLER, Minneapolis: The operation which Dr. Stone describes has been tried by me in one case. In this particular patient, because of infection of the wound, the operation was not a success. I am convinced, however, from the observation of this patient that the principle of the operation is right and I shall attempt to do it again when I have a case in which I think it is indicated. Dr. Stone didn't say—and I am sure that he doesn't believe—that this operation is a routine operation for the repair of an incontinent anus. It is only reserved for those cases in which a more simple operation will not suffice. I think it is especially indicated in those cases in which there is some congenital defect, or in some nerve injury, due to disease or to operation or accident. If operation for fistula in ano is done properly, one should almost never be called on to perform this particular operation as a secondary procedure. The case in which I operated did follow an operation for fistula. The incision had been made so deeply that the man almost had a total incontinence. Concerning Dr. Buie's paper, I know that among general surgeons, and I think the profession in general, surgical treatment of a rectal fistula is considered to be a minor procedure. In spite of this feeling, I know that, in the thousand cases which Dr. Buie reported, 51 per cent of the patients had previously been reported on one or more times. One patient was operated on fifteen times for the fistula without obtaining a cure. That corresponds to my own experience. If that percentage of persons with fistulas are not cured by the first operation there is something wrong with the way fistula surgery is being done. I am sure that the failure in these cases is due to the fact that there is a lack of conviction on the part of the operator as to just what is the cause of rectal fistulas. I think if all would realize that most rectal fistulas originate as an infection in a crypt of Morgagni and for that reason have an internal opening, then the fistulas will be cured.

DR. CURTICE ROSSER, Dallas, Texas: While it must be true that abscesses in the tissues adjacent to the anorectum are caused by an infection within the rectum with only the occasional hematogenic perirectal abscess as an exception, I believe that lymphatics act as carriers from within the anorectum in the majority of cases. The continued variance of opinion concerning the percentage incidence of tuberculosis is well illustrated by a comparison of the extremely low figures given by the author, which I believe to represent the true situation, and Mr. Ernest Miles's statement published only last month that abscesses of tuberculous origin represent about 14 per cent of the total number. It is possible that the continued feeling that the tubercle bacillus plays so important a part in the production of fistula arises from the tendency on the part of the profession to class every incompletely operated on and consequently unhealed fistula as tuberculous. Definite stress should be laid on the necessity for graded procedures in the operative treatment of all save simple fistulas not presenting active infection. Severance of the external sphincter muscle, an entirely safe procedure in the absence of excessive pyogenic tissue infiltration or complexity of the tract, may be a perilous step in the presence of these two factors, and postponement of muscle division until after the adjacent tissues are splinted by the healed scar of the first operative wound is often imperative.

DR. FRANK C. YEOMANS, New York: Most of the cases of incontinence that I have had have been the result of improper division of the sphincter muscles. Some of them have obtained good, others fair results from a plastic repair of the sphincters. I know of two cases that had good results from the procedure described by Dr. Stone, which are not included in his statistics. With regard to the injection of fistulas, I think it is highly important to inject the fistulas which cannot be diagnosed offhand. In recurrent fistulas it is important to inject for diagnosis. One should plan out and know the nature of the fistula before instituting treatment. If methylthionine chloride or other staining fluid, when injected, does not come through the internal opening, or if the fistula is complicated, it should be injected with a thin paste of bismuth or barium and stereoscopic roentgenograms taken. It is folly to rush in and attempt to make the correct diagnosis and plan the procedure at the last moment on the operating table. One point in the operative technic that would frequently prevent recurrence, as Dr. Rosser has said, is an operation in stages. That is, one should first cut up to the sphincter, then pass a seton from the wound through the internal opening and bring it out to the anus, tying it loosely. When the wound is healed up to the sphincter, the sphincter may be divided under a local anesthetic and the chance of incontinence is indeed slight.

DR. EDWARD G. MARTIN, Detroit: In my service at Detroit Receiving Hospital it is unusual when dealing with fistula not to complete the operative procedure in one stage. I am opposed to suturing contaminated tracts except under unusual circumstances, believing that healing by granulation under visual and digital control affords the surest method of permanent cure, even though excision has been thorough. Occasionally when the tract is long and superficial with the incision carried away from the anus for a part of the distance, then with an inch or so of skin intervening, the incision is carried on to the end of the tract. The area beneath the intervening skin is thoroughly curetted or excised; healing takes place promptly underneath this curetted area with free drainage into the remaining portion of the tract either way. Too wide a gap is thus avoided, and practically there are two granulating areas remaining. The same idea may be accomplished by a suture or two midway in a tract. As has been stated, the internal opening is easily discovered; I use a hooked probe. In simple fistula, excision of the tracts can well be accomplished without the injection of tracing material, since infected tissue in the tract distinctly differentiates itself from normal tissue. I am convinced, however, that properly prepared bismuth paste is superior to any other tracer. Ten per cent bismuth subnitrate in petrolatum, with sufficient liquid petrolatum added to afford easy injection without heating, will frequently disclose small hidden tracts

when a simple stain will not do so. Pressure around the extent of a presumed completed operation may bring a drop of bismuth paste into view when an obscure tract is present which otherwise may be overlooked; this accounts for the so-called recurrence in many instances. Frequent digital exploration of the tracts postoperatively, will avoid so-called bridging and permit the even filling of the open areas by granulation. It is unusual, in my practice, to use secondary packing.

Dr. Harvey B. Stone, Baltimore: I agree with Drs. Grove and Fansler that the element of infection is the principal source of failure in the plastic operation. With regard to Dr. Grove's suggestion in cases in which one expects unusual difficulty from that source—for instance, in two of my cases with mucous colitis beforehand—I think it would be good judgment to do a preliminary colostomy to protect the wound additionally from infection. I also agree with Dr. Fansler that this operation was never intended to be the first resort in all cases in which there has been some damage to the sphincter muscle. In a great number of birth injuries, as every one knows, there is usually a large percentage of satisfactory results by a simple plastic operation, which is much easier to perform than this and generally gives adequate results. However, the point about this operation that is of particular value, I think, is that provided the gluteus muscles are functioning it may be employed with a good prospect of great improvement, even though the sphincter muscle is entirely destroyed, or even though it is lacking in innervation from some congenital matter. It gives one a resource in those cases which, lacking some such thing as this, it would be perfectly hopeless to attack by any sphincter or plastic outlet operation. There are one or two points I should like to emphasize. In the first place, since this operation depends on the use of the gluteus muscles as a voluntary constricting agent, education of the patient after the operation plays a large part in the extent of success obtained; and for a good while afterward, for some months, the patient should be followed and directed in keeping the glutei contracted and learning to use the gluteus muscles when there is an impulse for passage of a stool or gas. Then, since the gluteus is a voluntary muscle, this is not an automatic control and if the patient is not trained to use the muscle consciously he will not get automatic retention of rectal contents, such as he has with a normal sphincter muscle.

Dr. Louis A. Buie, Rochester, Minn.: I have previously given my opinion with regard to the injection of a solution into the external sinus of an anal fistula, to aid in following the ramifications of the tract. I have not found it necessary to make the injection to determine the presence or absence of the internal opening because the internal opening is never absent. The characteristic appearance of the walls of the fistula is as easy to distinguish from normal tissue as when the walls are painted with some colored solution. Hence the fistula can easily be traced. Unless the anal sphincters are completely relaxed the solution cannot be forced through to the internal opening, and, furthermore, much more satisfactory methods have been described for locating the source of infection. In dealing with ischiorectal abscesses it is not usually advisable to attempt the curative operation in one stage. This would necessitate attacking the internal opening when incising the abscess. If the abscess is not very large, if the tract connecting it with the source of infection is not deep or complex, and if the patient is not very sick, it may be done. Ordinarily, however, the abscess should be opened with a cruciform incision, after which the points of the cross are cut away so as to leave an external opening as large as the most spacious part of the abscess cavity, if this is possible. Sufficient time should be allowed to permit fibrosis of the walls of the fistula and subsidence of the acute process, before the fistula is excised. A digital rectal examination should be performed as a routine in connection with all general examinations. It is not necessary to subject all patients to proctoscopic examination. The clinician should be relied on to determine the necessity of further investigation. If a patient complains of any departure from normal bowel function or if the clinician's digital examination reveals anything suspicious, an examination with the proctoscope is indicated. Recently only 9 per cent of patients registering at the Mayo Clinic have been examined proctoscopically. Clinicians, in the clinic, however, prove a highly satisfactory safeguard.

THE DIFFERENTIATION OF PERIPHERAL ARTERIAL SPASM AND OCCLUSION IN AMBULATORY PATIENTS*

W. J. MERLE SCOTT, M.D.
AND
JOHN J. MORTON, M.D.
ROCHESTER, N. Y.

Careful clinical examination yields most of the information needed in the study of vascular diseases of the extremities. The appearance of the limb in the horizontal, the elevated and the dependent positions, the return of color after temporary local compression and after elevation (including the angle of circulatory sufficiency), the comparative warmth of the parts, and palpation for arterial pulsations suffice to demonstrate circulatory impairment and to indicate roughly its degree. These accepted methods of physical examination fail, however, to show the cause of this deficiency: whether it is dependent on a mechanical plugging of the vessels or on vascular spasm. It has long been common knowledge that certain rare vascular disturbances are dependent on an arterial spasm. The spastic element in these interesting but infrequent syndromes, such as true Raynaud's disease, can usually be suspected from the history of paroxysmal seizures related to cold and separated by intervals of complete freedom. Only recently, however, has the importance of vasoconstriction in causing the circulatory deficiency in many instances of the common vascular diseases of the extremities been realized. And the presence of arterial spasm in them is frequently made manifest neither by the history nor by the most careful examination. A test that differentiates occlusion and spasm and that measures each of these elements when both are present has become an essential requirement in the study of peripheral vascular diseases.

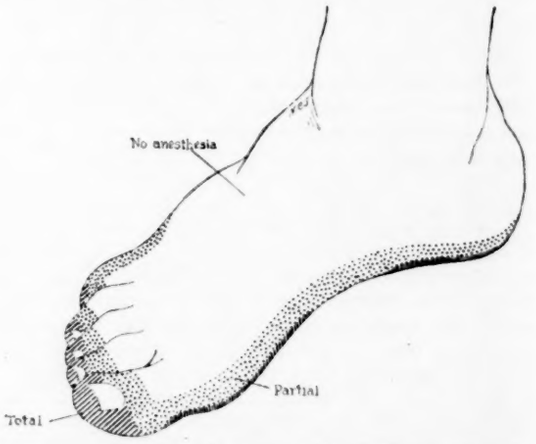


Fig. 1.—Area of anesthesia from blocking the posterior tibial nerve. The inhibition of sweating covers almost the same field. After the procaine solution has been injected, anesthesia and hyperthermia appear first sometimes in the field of distribution of the medial plantar, the lateral plantar or the calcaneal branch. If the needle point has been in the proper compartment, however, all three of the branches are anesthetized within fifteen to twenty minutes.

The first method of clinical importance for separating these elements was Brown's [1] vasomotor index obtained by typhoid vaccine administration. Owing to the dis-

* Read before the American Society for Clinical Investigation, Atlantic City, N. J., May 4, 1931.

* From the Department of Surgery, the University of Rochester School of Medicine and Dentistry.

1. Brown, G. E.: The Treatment of Peripheral Vascular Disturbances of the Extremities, J. A. M. A. **87**: 379 (Aug. 7) 1926.

agreeable features of this procedure, its inconvenience and danger, we [2] developed a method for measuring the amount of vasoconstriction, depending on the increased circulation rate to the foot following spinal anesthesia. (White [3] and Brill and Lawrence [4] independently demonstrated that spinal anesthesia caused an increase in surface temperatures of the feet.) Subsequently the effect of this known paralysis of vasomotor fibers on normal and pathologic vessels was used as a basis of comparison in our other studies. General anesthesia was found to give the same complete obliteration of vasoconstriction,[5] though the mechanism of accomplishing this is less obvious. Consequently the peripheral thermal effect of general anesthesia was used as a diagnostic measure in vascular diseases involving the upper extremity and frequently instead of spinal anesthesia in the lower extremities. The distinction of spasm and occlusion obtained in these ways became so essential to us in the clinical study of peripheral vascular diseases that a further simplification seemed highly desirable, so that the test could be carried out on ambulatory patients without any significant inconvenience.

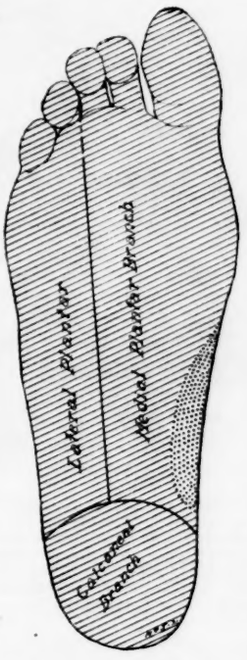


Fig. 2.—Plantar view of figure 1.

Since the clinical experiments of Weir Mitchell [6] and Waller,[7] it has been known that the paralysis of a peripheral nerve trunk by cold is associated with a hyperthermia in the anesthetic zone. Braun [8] and Wiedhopf [9] emphasized the similar phenomenon after nerve block with procaine hydrochloride. Lewis [10] advised the utilization of the latter procedure as a qualitative test in selecting cases of Raynaud's disease that would be benefited by sympathectomy. White,[3] on the anesthetization of the sciatic nerve for pain, reported an increase in the surface temperature comparable to that seen after spinal anesthesia. It was obvious, therefore, that the blocking of peripheral nerves would cause considerable vasodilatation. It was necessary to prove how completely normal vasoconstriction and pathologic arteriospasm would be overcome before this simple method of regional anesthesia could be utilized in a quantitative test for differentiating spasm and occlusion.

The commonest vascular lesions in the extremities involve chiefly the feet; the most marked spasm and the most severe circulatory disturbance usually manifest themselves first in the toes. The posterior tibial nerve, whose trunk becomes easily accessible just below the internal malleolus, furnishes the cutaneous innervation of the sole of the foot and the plantar surface of the toes (figs. 1 and 2). It is ideal for providing the data desired concerning the results of nerve block.

In order to establish the response of normal vessels to this procedure, the posterior tibial nerve was anesthetized with procaine in seventeen medical students. Satisfactory anesthesia was obtained in all cases. About ten minutes after the procaine had been injected the surface temperatures began to rise in the area of cutaneous distribution of the nerve. In fact, a subjective feeling of warmth in the foot is often perceived by the individual before sensory anesthesia is evident. The surface temperatures in the anesthetic field rose progressively at varying rates to a maximum point. (Figure 3 is a typical example.) But a similar height was attained by all; the maximum temperature on the great toe averaged 31.2 C., in all cases coming within 1 degree of this figure. All these determinations were made under standard conditions in a constant temperature room at approximately 20 C. Thus, in the groups of individuals with normal blood vessels, the lower limit of the temperature increase is about 1 degree less after nerve block than after spinal or general anesthesia. (All readings were corrected for a room temperature of 20 C.) In order to make this correlation more exact, the two methods were compared in the same patient (fig. 4). The left posterior tibial nerve was blocked with procaine. After the maximum response to this procedure had been obtained, the patient was given a nitrous oxide-oxygen anesthesia. Following this the skin temperature of the toes reached a slightly higher level than that after the nerve block, but the difference was only 0.7 degree C. By comparing the results of these methods for releasing vasoconstriction, it is seen that the increase in the local circulation is nearly as great after nerve block although the innervation of the main arterial trunks is intact. The hyperthermia caused by anesthetization of the posterior tibial nerve is satisfactory for use as a quantitative method for differentiating the circulatory deficiency of vasoconstrictor spasm from that of occlusion. The lower limit of the normal vasodilatation level by this method is 30.5 C. (room temperature, 20 C.).

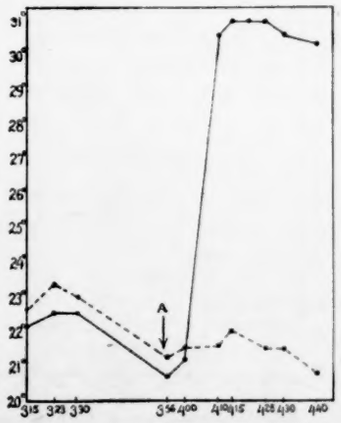


Fig. 3.—Normal response to procaine block of the posterior tibial nerve: solid line, left toe; broken line, right toe; *A*, stage at which injection was made into the left posterior tibial nerve.

TECHNIC OF THE TEST

It is ascertained by the accepted methods of clinical examination that a circulatory deficiency exists in the lower extremity. The patient is placed at rest on a bed or table with the feet and legs to the knees exposed, in a quiet room in which the temperature (at the level of the patient) is as near as possible to 20 C. (The range permitted is from 18 to 23 C.) The temperatures on the toes and soles are taken at five minute intervals with an instrument which accurately measures the true

2. Morton, J. J., and Scott, W. J. M.: The Measurement of Sympathetic Vasoconstrictor Activity in the Lower Extremities, J. Clin. Investigation **9**: 235 (Oct.) 1930.
3. White, J. C.: Diagnostic Blocking of Sympathetic Nerves to Extremities with Procaine, J. A. M. A. **94**: 1382 (May 3) 1930.
4. Brill, S., and Lawrence, L. B.: Changes in Temperature of the Lower Extremities Following the Induction of Spinal Anesthesia, Proc. Soc. Exper. Biol. & Med. **27**: 728 (May) 1930.
5. Scott, W. J. M., and Morton, J. J.: Obliteration of Vasoconstrictor Gradient in the Extremities Under Nitrous Oxide-Oxygen, Ether and Tribrom-Ethyl Alcohol Anesthesias, Proc. Soc. Exper. Biol. & Med. **27**: 945 (June) 1930.
6. Mitchell, S. W.: Cases of Lesions of Peripheral Nerve-Trunks with Commentaries, Am. J. M. Sc. **85**: 17 (July) 1883.
7. Waller, quoted by Mitchell (footnote 6).
8. Braun, H.: Experimentelle Untersuchungen und Erfahrungen über Leitungsanaesthesie, Arch. f. klin. Chir. **71**: 179, 1903.
9. Wiedhopf, Oskar: Experimentelle Untersuchungen über die Wirkung der Periarteriellen Sympathectomie und der Nervenvereisung auf die Gefässe der Extremitaten, Beitr. z. klin. Chir. **130**: 399, 1923.
10. Lewis, T.: Experiments Relating to the Peripheral Mechanism Involved in Spasmodic Arrest of the Circulation in the Fingers: A Variety of Raynaud's Disease, Heart **15**: 7 (Aug.) 1929.

skin temperature.[11] After the level of the surface temperature has been established (the surfaces are usually exposed at least twenty to thirty minutes), the posterior tibial nerve is blocked just below the internal malleolus, by the injection of from 8 to 10 cc. of 1 per cent procaine solution about it (fig. 5). The nerve can usually be felt quite readily just behind the lower part of the external malleolus. It is followed forward as far as it can be easily palpated, usually to a point about 2 cm. directly beneath the posterior border of the malleolus, and the injection is made at this point in order to avoid injury to the vessels. The nerve is immobilized by hooking the finger under it. The point of the needle must be under the deep fascia in the same compartment with the nerve. It is not necessary or particularly desirable to inject the procaine into the nerve itself.

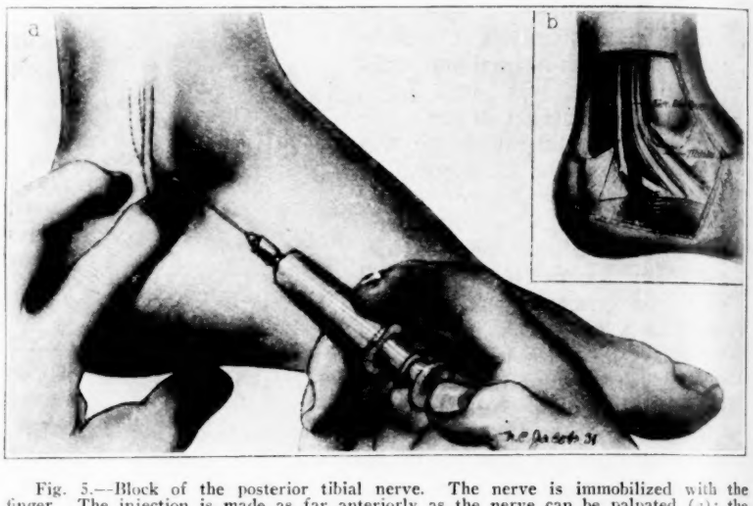


Fig. 5.—Block of the posterior tibial nerve. The nerve is immobilized with the finger. The injection is made as far anteriorly as the nerve can be palpated (*a*); the point of injection will therefore be after the nerve has crossed under the vessels (*b*). If the posterior tibial artery is pulsating, it can usually be felt just back of the index finger as the latter immobilizes the nerve. The needle may touch the nerve but is not inserted into it. However, the solution must be deposited beneath the deep fascia in the same compartment as the nerve.

If the injection is properly made, loss of tactile sensation in the area of distribution begins within fifteen minutes. In order that this test shall be valid, complete anesthesia to touch must be obtained in the area investigated. (This is best tested by the light scratching of a pointed instrument such as a pin. Very light touch from cotton may not be appreciated on the sole of the foot, while a heavy pressure may be recognized even in a completely anesthetized area from the nerve fibers of deep sensation. The type of stimulation used must be proved satisfactory before the nerve is blocked.) The surface temperatures are recorded at intervals (every five minutes) until the maximum is attained; this occurs usually from fifteen to thirty minutes after the induction of a satisfactory anesthesia. The height of the surface temperature in the anesthetic area is then corrected for the room temperature; 0.3 degree is added to or subtracted from the reading for each degree by which the room temperature exceeds or falls below 20 C.[12] This corrected maximum is then compared to the normal vasodilatation level. If the surface temperature of the toe has gone up to equal or exceed 30.5 C., vasoconstrictor spasm is the cause of the local circulatory deficiency. If there is no increase in the temperature following the nerve block, vasoconstriction plays no rôle in the vascular disease. And if there is a definite increase in the surface temperature, which fails, however, to reach the normal vasodilatation level, the condition belongs in the mixed group and vasoconstriction is an element but not the only element in causing the circulatory deficiency.

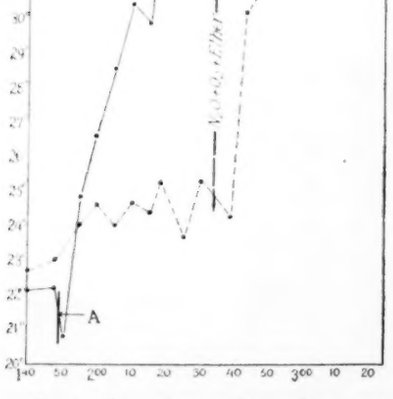


Fig. 4.—Comparison of the maximum surface temperature elevations produced by nerve block and by general anesthesia; the difference is less than 1 degree C.: solid line, left toe; broken line, right toe; *A*, stage at which injection was made into the left posterior tibial nerve.

APPLICATION TO PERIPHERAL VASCULAR DISEASES

The way in which this method assists in the examination of the common vascular diseases of the extremities is illustrated in the following two cases, which appeared clinically to be similar in their nature:

CASE 1.—*History.*—C. W., a man, had a mild case of diabetes, with marked arteriosclerosis. No pulsations were palpable in the posterior tibial or dorsalis pedis arteries on either side, but pulsations were felt in both popliteal arteries. There was an impending gangrene of the right great toe, with pain in this area. There was slight rubor in the left foot on standing, but the patient had no symptoms on this side. The clinical diagnosis was endarteritis obliterans in the lower portion of both legs with impending gangrene in the right leg. It had previously been shown by this test that the arterial disease on the right was entirely occlusive. The left side was tested to determine the character of its arterial lesion.

The blocking of the left posterior tibial nerve was followed by no increase in the surface temperature on the left great toe (fig. 6) or sole (not shown on chart). There was an increase on the heel to a maximum of 28.4 C.

Interpretation.—No vasoconstriction in the toe, some vasoconstriction evident in the heel, but not to the normal vasodilatation level.

Application to Diagnosis.—The vascular lesion affecting the left foot is primarily occlusive. Removal of sympathetic innervation would not assist the circulation to the anterior part of the foot.

CASE 2.—*History.*—F. S., a man, aged 65, had had mild diabetes for six years. For a year he had suffered pain in the left foot with dependent rubor. Recently there had been pain also in the right foot. Pulsation was absent or very slight in the left posterior tibial and dorsalis pedis arteries, and fairly good in the right posterior tibial artery. The pulsation in both popliteal arteries was good. The clinical diagnosis was diabetic endarteritis obliterans.

Injection of the left posterior tibial nerve was followed by a sharp increase in the surface temperature of the left toe to

11. All surface temperature determinations were made with the dermotherm, which has already been described (Scott, W. J. M.: An Improved Electrothermal Instrument for Measuring Surface Temperatures, J. A. M. A. **94**: 1987 [June 21] 1930).

12. This correction for room temperature is explained in the following two articles:
Scott, W. J. M., and Morton, J. J.: Sympathetic Activity in Certain Diseases, Especially Those of the Peripheral Circulation, Arch. Int. Med., to be published.
Morton, J. J., and Scott, W. J. M.: Methods of Estimating the Degree of Sympathetic Vasoconstriction in Peripheral Vascular Diseases, New England M. J. **204**: 995 (May 7) 1931.

a maximum of 31 C. (fig. 7). This is to the normal vasodilatation level. As the arterial lesion in this case was thought to be purely occlusive, the result of the test was a surprise. It was checked with general anesthesia, under which the temperature of the left toe rose to 31.5 and that of the right to 31 C.

Interpretation.—Attainment of normal vasodilatation level after procaine block. (The result was checked by paralyzing peripheral vasoconstriction with general anesthesia.)

Application to Diagnosis.—Circulatory impairment is entirely dependent on vasoconstrictor spasm. Sympathetic denervation will greatly improve this patient.

In another place we [12] have discussed the importance of the differentiation between arterial spasm and occlusion, both for the understanding of the disease process and also in the clinical management of these patients. Therapeutic measures in the group dependent chiefly on vasoconstrictor spasm should be along radically different lines from those in the group dependent exclusively on occlusion. And in the mixed group the relative participation of the two elements is significant.

This method of differentiating the effects of vasoconstriction from those of occlusion is applicable also to the upper extremity. The ulnar nerve at the elbow or the median nerve just above the wrist is blocked with procaine and the temperature changes in the anesthetized area are followed. If the hand is cool initially, the hyperthermia induced is so striking that the difference in temperature between the two sides of the ring finger has easily been appreciated by palpation during ulnar anesthesia. From our experience the normal vasodilatation level is approximately the same as for the feet. But we have not carried out anesthesia in the hands in a sufficient number of normal persons to establish this figure with mathematical exactness.

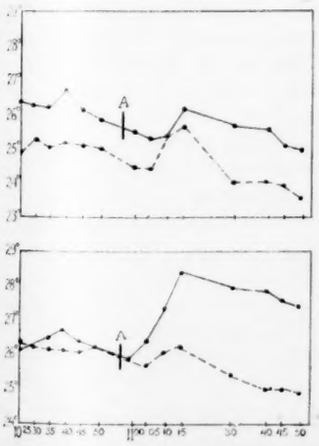


Fig. 6 (case 1).—In a case of arteriosclerotic endarteritis obliterans, after blocking of the left posterior tibial nerve, there was no increase in the temperature of the toe, while there was some increase in the temperature of the heel. The circulatory deficiency in the toes was entirely dependent on occlusion. In the upper chart the solid line indicates the left toe; the broken line, the right. In the lower chart the solid line indicates the left heel; the broken line, the right. *A* in each chart indicates the point of injection into the left posterior tibial nerve.

Raynaud's disease offers a special and complicated problem. It can easily be verified that the attacks of arterial spasm can be induced even when vasoconstrictor impulses are entirely eliminated from the area involved, as Lewis and his co-workers [10] maintained. However, in the mild and moderately severe cases, at ordinary room temperature, the spasms appear to be initiated chiefly by sympathetic impulses and, conversely, the attacks can be greatly diminished in severity and frequency in the patient's usual environment by the permanent abolishment of such impulses to the involved extremities. Consequently, in Raynaud's disease the reaction to the test we have outlined varies somewhat. Often the blocking of the appropriate nerves causes a relaxation of the spasm in the anesthetic area, though usually this result differs from that in other forms of arterial spasm. The vascular dilatation in Raynaud's disease is slowly progressive and some degree of impairment in the local circulation can be seen for a considerable time after the establishment of complete anesthesia. The severe cases of Raynaud's disease offer exceptions to the foregoing test for distinguishing arterial spasm and occlusion. Although dependent on arterial spasm, they may show no increase in the surface temperature, or one which falls far short of the normal vasodilatation level. A study of this type of complicated vascular response is being reported separately.[13] This exception in Raynoud's disease offers no difficulty in the application of the test to the common vascular diseases, as its diagnosis is easily made from the character of the attacks, when they are severe enough to fail to respond to nerve block.

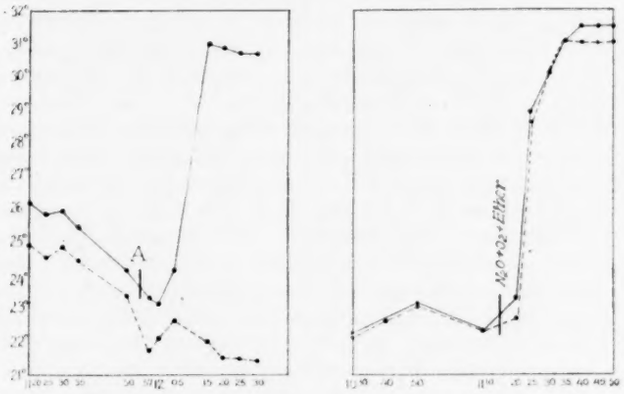


Fig. 7 (case 2).—Vasoconstrictor arteriospasm. Clinically, the case was diagnosed as diabetic endarteritis obliterans. After blocking of the left posterior tibial nerve, the temperature on the toe rose to the normal vasodilatation level. The same type of response occurred after general anesthesia and to a point only 0.5 degree C. higher. The solid line indicates the left toe; the broken line, the right. *A* indicates the point of injection into the left posterior tibial nerve.

CONCLUSIONS

1. A simple method is outlined to differentiate vasoconstrictor spasm from occlusion in the common vascular diseases of the extremities.

2. This test can be carried out easily in ambulatory patients. It has eliminated the inconvenience and danger of previous methods and does not require hospitalization.

13. Morton, J. J., and Scott, W. J. M.: Some Angiospastic Syndromes in the Extremities, Tr. Am. Surg. A., to be published.

Naming the Vitamins.—Funk's term vitamine was criticized because it implies that these substances are amines, which is not proven in any case and certainly not probable in all, and because the choice of "vita" as a designation was thought by some to carry an exaggerated implication of unique responsibility for life and vitality whereas other substances such as tryptophane are no less essential. But if "vita" seems to claim too much, the designation "accessory" suggested by Hopkins is certainly too modest, since an accessory substance would ordinarily be judged to be dispensable whereas the indispensability of these substances is one of their most marked characteristics. In order to avoid these difficulties McCollum suggests that, until such time as chemical names can properly be assigned to them, these substances be known by alphabetical designations qualified only by such statement of their solubilities as may seem helpful. In his earlier rations of supposedly purified foodstuffs McCollum unwittingly furnished water-soluble vitamin in the lactose fed. Hence, he had at first concluded that the fat-soluble substance of butter, egg-fat, etc., was the only unidentified substance essential to normal nutrition. Thus this became, in his alphabetical terminology, "fat-soluble A," and the water-soluble substance which he next recognized as essential was designated as "water-soluble B." A little later the antiscorbutic substance was included in the alphabetical terminology as "water-soluble C."—Sherman and Smith: The Vitamins, New York, Chemical Catalog Company, Inc., 1931.

PATHOLOGIC CONDITIONS SECONDARY TO ACHLORHYDRIA *

ELMER L. EGGLESTON, M.D.
BATTLE CREEK, MICH.

Achlorhydria, or the absence of free hydrochloric acid from the gastric secretions, is not an uncommon finding, as it obtains in at least 10 per cent of patients with indications of digestive trouble presenting themselves for medical treatment. In 1924, I [1] reported a series of 2,730 cases studied by means of the fractional test meal, with 10 per cent showing complete absence of free hydrochloric acid. Prior to that time, Hurst [2] had reported a series of 225 cases studied by means of the fractional meal, with 10.5 per cent showing complete achlorhydria. My associate, Dr. James R. Jeffrey,[3] reports a series of 6,224 cases with 716, or 11.4 per cent, showing absence of free hydrochloric acid. Higher percentages have been reported but usually after the Ewald test meal, in which a higher percentage of patients exhibit achlorhydria than with the fractional meal. Since Dr. Jeffrey and I found a rather large number of our cases exhibiting a delayed acidity—at least 18 per cent exhibited achlorhydria at the end of one hour—we concluded that the Ewald test meal did not give us sufficient reliable information and discarded it. We are now using the fractional test meal as devised by Rehfuss, with more satisfactory results.

Practically all the information relative to acid values up to this time has been obtained from patients presenting themselves for examination, so that it is difficult for us to determine the incidence of achlorhydria among normal individuals. Such information as we have would indicate that it is not uncommon to find an achlorhydria among apparently healthy individuals. Bennett and Ryle [4] report a series of 100 healthy college students, in 4 per cent of whom achlorhydria was found. Wright [5] reports a series of 250 children between the ages of 6 and 15 years, with achlorhydria present in 1.6 per cent. Faber [6] reports a true achlorhydria as being present in 50 per cent of people above 50 years of age. He further reports that Dedichen found it in 66 per cent of apparently healthy people from 67 to 92 years of age and that Meulengracht, in Copenhagen, found it in 75 per cent of people past 70 years of age. Conner,[7] in reporting according to age with various diseases, shows an increase among young people between the ages of 10 and 19, a decided drop between the ages of 20 and 29, and a gradual increase after 30 years, reaching 67 per cent in individuals of 70 years or more. We find, therefore, that achlorhydria is relatively rare in early life but gradually increases until, according to our present information, it is present in more than 50 per cent of the aged.

* From the Battle Creek Sanitarium.
* Read before the Section on Gastro-Enterology and Proctology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

1. Eggleston, E. L.: Gastric Secretory Disturbances, J. A. M. A. **83**: 260 (July 26) 1924.
2. Hurst, A. F.: Achlorhydria: Its Relation to Pernicious Anemia and Other Diseases, Lancet **1**: 111 (Jan. 20) 1923.
3. Jeffrey, J. R.: Personal communication to the author.
4. Bennett, T. I., and Ryle, J. A.: Studies in Gastric Secretion: Study of Normal Gastric Function, Guy's Hosp. Rep. **71**: 286 (July) 1931.
5. Wright, C. B.: Gastric Secretion, Gastro-Intestinal Motility and Position of Stomach, Arch. Int. Med. **33**: 435 (April) 1924.
6. Faber, K.: Chronic Gastritis: Its Relation to Achylia and Ulcer, Lancet **2**: 901 (Oct 29) 1927.
7. Conner, H. M.: Hereditary Aspect of Achlorhydria in Pernicious Anemia, J. A. M. A. **94**: 606 (March 1) 1930.

ETIOLOGY

The etiology of achlorhydria, according to such authorities as Faber [6] and Hurst,[8] is usually a gastritis of the chronic type. While the introduction of the infection responsible for the gastritis may be with the food, it is usually blood borne and secondary to disease in some other part of the body. The fundamental conception of an achlorhydria secondary to a gastritis might warrant the belief that all the secretory glands had been completely destroyed, but it is in all probability a gradual process and occurs after a considerable period of time. According to Faber, complete atrophy of the glands of the mucosa rarely obtains, the achlorhydria obtaining long before such serious injury results. He also calls attention to the fact that achlorhydria as indicating a complete absence of ferments as well as free hydrochloric acid rarely obtains, even in cases of definitely proved primary anemia. Achlorhydria has been considered by some to be a congenital condition, but this is strongly combated by Faber, who says:

> Neither deficient etiology nor lack of symptoms warrants us in assuming the existence of a congenital constitutional achylia. All the cases are explained most readily and naturally by taking exogenous gastritis as the cause. This does not exclude the possibility that some individuals are more disposed to the disease than others, but as yet there is no material to warrant the conclusion that it is hereditary or familial as, for instance, polydactylism, Huntingdon's chorea, and the like. It is only natural that such a common disease as achylia should be found in several members of the same family, but this is no proof of heredity. At most it is a sign of increased susceptibility.

Conner [7] made a careful study to determine the possibility of living conditions being a factor in the production of achlorhydria and the possibility of there being a congenital tendency. His conclusions are that, while achlorhydria cannot be proved a hereditary condition, there are indications of a familial tendency toward its development.

Summary of One Hundred Cases of Achylia Gastrica

Men, 28; Women, 72
Average Age, 52

Diagnosis	No. of Cases
Fatigue, chronic	36
Glossitis	9
Gastritis, chronic	7
Anemia, secondary	16
Anemia, primary	7
Chronic cholecystitis	13
Combined lateral sclerosis	17

Bowel Condition	No. of Cases
Normal	14
Constipation	75
Diarrhea	8
Alternate constipation and diarrhea	3

It has been recognized that achlorhydria was a precursor of certain pathologic states, such as primary anemia, subacute combined degeneration of the cord, secondary anemia, and gastrogenous diarrhea, and that it was present in a considerable percentage of cases of chronic arthritis and biliary tract disease. In many cases of achlorhydria there are no definite indications of digestive trouble and it might easily be overlooked, while in others the symptoms are so classic that the diagnosis could almost be made without gastric analysis. The symptoms may strongly resemble those seen in duodenal ulcer, as to the incidence of pain, relief after the ingestion of alkalis, and the like, but definite information can be obtained only by gastric analysis,

8. Hurst, A. F.: Precursors of Carcinoma of the Stomach, Lancet **2**: 1023 (Nov. 16) 1929.

which in our opinion should be done early in all cases exhibiting indications of gastro-intestinal symptoms or symptoms of chronic illness. In reviewing a series of 100 consecutive cases in our work exhibiting achlorhydria, we find that the diagnoses presented in the accompanying table have been made.

This group of subjects consisted of patients presenting themselves for examination in a routine way, usually complaining of digestive symptoms of such a character as to warrant a gastric analysis; they could not be considered as normally healthy individuals. There was an entire absence of ferments in only thirty-one of these cases. Histamine as a gastric stimulant was used in a part of the analyses. We found that with a total acidity of below 16, with an entire absence of free hydrochloric acid, there is little if any response to histamine. We are therefore of the opinion that for practical purposes it is not necessary to resort to its use as a routine measure.

ACHLORHYDRIA IN ANEMIA

For some years it has been known that achlorhydria always precedes primary or Addison's pernicious anemia. It was difficult to determine just how long this condition had persisted prior to the anemia, as in the great majority of cases a gastric analysis had not been made until the trouble was far advanced. In some of our cases the achlorhydria had persisted for at least ten years prior to the diagnosis of pernicious anemia. Just why should primary anemia develop in an individual with an achlorhydria? This problem has been discussed by the medical profession for a great many years, and various theories have been advanced. The hypothesis of an intestinal toxemia has had many adherents, but proof of a specific toxemia of a hemolyzing character, which might have a depressing effect on the bone marrow function, has been lacking. Not until the epoch-making work of Castle, Townsend and Heath[9] was the problem satisfactorily elucidated, and the profession owes them a great debt for their painstaking efforts. They proved quite conclusively that in cases of achlorhydria or achylia gastrica a primary anemia develops secondary to an imperfect digestion of the proteins. They conclude:

> The experiments are then uniform in support of our original conception of the nature of the disease. Addison's pernicious anemia is due to a virtual deficiency brought about even in the presence of a diet adequate for the normal individual by a defective gastric digestion of protein as a result of achylia gastrica.

They further prove that this lack of protein digestion is not due to the absence of free hydrochloric acid, nor is it due to the absence of pepsin or to the absence of both hydrochloric acid and pepsin, as many cases exhibiting an achlorhydria with the absence of pepsin fail to exhibit any anemia whatever. Their conclusions are that it is due to the lack of an intrinsic substance secreted by the normal gastric mucous membrane, which interacts with some extrinsic factor in beef muscle to form a hematopoietic substance capable, in the presence of a normal diet, of promptly relieving the anemia of a patient suffering from primary anemia. In their opinion this is an organic thermolabile substance, possibly an enzyme, as it is destroyed by heat. Sturgis and Isaacs,[10] in isolating a hematopoietic substance from the stomach of the hog, confirm the conclusions of Castle and his associates that this intrinsic substance is definitely a product of the normal secretory glands of the stomach.

Just why pernicious anemia does not develop in all cases exhibiting an achlorhydria or achylia gastrica has not as yet been definitely determined. Castle and his associates point out that even in the absence of free hydrochloric acid and pepsin the hypothetic substance may remain for a long time and that many cases of achylia may be potential cases of pernicious anemia later on. While the absence of both hydrochloric acid and pepsin often indicates the absence of this hypothetic substance, it is certainly not necessarily the case. It would nevertheless appear that the factor which destroys the secretion of hydrochloric acid and pepsin may also be responsible for the loss of this essential substance. Cases closely resembling primary anemia have been reported after a subtotal gastrectomy, which would bear out this hypothesis of Castle and his associates. Frequent references to secondary anemia in cases exhibiting achlorhydria have been made. Borgbjaerg and Lottrup[11] report that, in a series of cases exhibiting achlorhydria, 50 per cent showed some degree of anemia, with the color index above 1 in 22 per cent and megalocytosis in 15 per cent. In all probability the cases of achlorhydria exhibiting secondary anemia may be cases in which the hypothetic substance has not been completely obliterated, possibly early cases of primary anemia, and for this reason they should be carefully watched.

ACHLORHYDRIA IN RELATION TO MALIGNANT CONDITIONS OF THE STOMACH

Since it is estimated that the stomach is the primary site of malignant conditions in from 30 to 40 per cent of all cases, and since the specific etiology of malignancy is unknown, the chief concern lies in the premalignant conditions that possibly favor the development of cancer. Achlorhydria is frequently observed in malignant conditions. Can it in any way be considered a forerunner of cancer? At one time the presence of free acid in the gastric contents was considered as definite evidence against such a diagnosis. Friedenwald[12] reports that achlorhydria obtained in 90 per cent of 733 cases. Hurst[8] reports achlorhydria in 65 per cent of seventy-four cases at Guy's Hospital and New Lodge Clinic. Hartman[13] reported the presence of an achlorhydria in 50 per cent of a series of cases.

It is now known that a malignant condition of the stomach may obtain with a normal acidity or even with a hyperchlorhydria, but it has not been considered that an achlorhydria was a specific precursor of malignancy. Just what relation does the achlorhydria have to the malignant process? Is the latter the cause of the achlorhydria by a destruction of the secretory glands, or does the achlorhydria precede it? It is now recognized that the malignant process is rarely so extensive as to warrant the conclusion that it might produce an achlorhydria by its destruction of glandular tissue. Frequently, achlorhydria is found when the growth has invaded but a slight portion of the stomach wall. It is now considered probable that a chronic gastritis may be an etiologic factor in the production of malignancy and that the achlorhydria may be secondary to the gastritis. Hurst[8] is of the opinion that, in about 75 per cent of cases, carcinoma is secondary to chronic

9. Castle, W. B.; Townsend, W. C., and Heath, C. W.: Observations on Etiologic Relationship of Achylia Gastrica to Pernicious Anemia, Am. J. M. Sc. **180**: 305 (Sept.) 1930.
10. Sturgis, C. C., and Isaacs, Raphael: Desiccated Stomach in Treatment of Pernicious Anemia, J. A. M. A. **93**: 747 (Sept. 7) 1929.
11. Borgbjaerg, A., and Lottrup, M. C.: Blutuntersuchungen bei der Achylie, Acta med. Scandinav. **72**: 539, 1929.
12. Friedenwald, J.: A Clinical Study of One Thousand Cases of Cancer of the Stomach, Am. J. M. Sc. **148**: 660, 1914.
13. Hartman, H. R.: The Prognostic Value of Gastric Acidity in Cases of Resectable Carcinoma, J. A. M. A. **83**: 1976 (Dec. 20) 1924.

atrophic gastritis. His reasoning appears sound when he contends that a healthy gastric mucosa is rarely if ever attacked by a malignant process. It would seem that the malignant process instead of being a direct result of the achlorhydria might be secondary to the pathologic process that caused a destruction of the secretory glands of the stomach, but one should be on the lookout for the possible later development of a malignant condition in cases exhibiting an achlorhydria.

ACHLORHYDRIA AS A CAUSE OF DIARRHEA

Diarrhea as a symptom in cases of achlorhydria occurs far less frequently than constipation, but when present it may be very disturbing to the patient and require painstaking work on the part of the physician to rule out the most specific causes, such as parasites, tuberculosis and chronic ulcerative colitis. The term gastrogenous diarrhea has been applied in cases in which no specific cause for the diarrhea can be found other than the achlorhydria. These patients make marked improvement after the administration of hydrochloric acid, the diarrhea promptly subsiding without change in diet and without the necessity of resorting to astringents. Wilkinson and Oliver,[14] commenting on gastrogenous diarrhea, describe an achlorhydric syndrome the clinical picture of which is somewhat as follows: chronic diarrhea, usually persisting over a period of years, colicky pains, flatulence, mild secondary anemia and recurring attacks of glossitis. The patient is seldom incapacitated but complains of lack of physical vigor and is often neurotic. This is a true picture in the majority of cases exhibiting a gastrogenous diarrhea, but in them are also recognized some of the early symptoms of primary anemia. It is frequently noted that cases of achlorhydria under roentgen observation may exhibit decided hypermotility, the barium leaving the stomach in so short a time as one hour and reaching the rectum in from two and one-half to three hours. Under such conditions the digestion must be very imperfect. In the presence of a highly putrefactive intestinal flora, it is not impossible that irritating substances are formed which might tend to produce a diarrhea as a result of the colon irritation or colitis, and, while the comfort of the patient demands the relief of this symptom, one should not fail to recognize that this is only one of the results of a chronic gastritis and achlorhydria.

ACHLORHYDRIA IN RELATION TO GALLBLADDER DISEASE

Is there some relation between gastric secretions and biliary tract disease? Cheney[15] reports that achlorhydria is present in 25 per cent of cases of chronic cholecystitis and that with those cases in which the acidity is definitely below the normal the ratio rises to 50 per cent. He suggests that when chronic gastritis is found on examination for dyspeptic symptoms, with no definite cause for the symptoms, disease of the gallbladder should be suspected. Moynihan,[16] in discussing cholelithiasis says:

> We did not derive much help in diagnosis from an examination of the stomach contents by the Rehfuss method. Out of 77 cases we found complete achlorhydria in 17, hypochlorhydria in 3, a low normal in 14, a normal in 18, a high normal in 8, and hyperchlorhydria in 17. . . . The rate of emptying the stomach in these cases was: rapid in 27; normal in 34; delayed in 16.

In our series of 100 cases there were 13 with a diagnosis of chronic cholecystitis, the dye test being positive. We are of the opinon that, in chronic cases of gallbladder disease with stone formation, achlorhydria or hypochlorhydria is a much more frequent finding than hyperchlorhydria. The theory that the infection causing a chronic gastritis may be the etiologic factor in pathologic changes in the gallbladder has been advanced, and it is possible that the imperfect gastric digestion of proteins might favor a biliary stasis and in this way be a causative factor in the stone formation.

ACHLORHYDRIA AS AN ETIOLOGIC FACTOR IN CASES OF ARTHRITIS

We have not found that achlorhydria is a particularly constant observation in cases of arthritis. It may occur as a symptom in all chronic illnesses, but we have not felt that it was a definite factor in the causation of arthritis. Nevertheless, Faber[17] reported in 1913 that he found achylia gastrica in fifteen of sixty-five patients suffering from chronic polyarthritis. Borries[18] reported that, by the Ewald method, achylia was present in 30 per cent of ninety-four cases, while Lottrup[19] reported a series of cases of chronic progressive primary polyarthritis in which 44 per cent of the patients had achlorhydria or achylia gastrica, while 58 per cent had a simple anemia. My impression is that these observers used the Ewald method, which would give too high an incidence of achlorhydria.

CHRONIC FATIGUE IN CASES EXHIBITING ACHLORHYDRIA

In our 100 consecutive cases, chronic fatigue was given as a prominent symptom in 36 per cent. There might be a question as to whether the fatigue was the cause or the result of the achlorhydria. We do not attempt to answer this, but in some cases a neurocirculatory asthenia was the outstanding symptom, and we would be inclined to add it to the achlorhydric syndrome previously mentioned. The high incidence of this symptom is an indication that the individual suffering from an achlorhydria is a potential invalid. Fatigue is one of the early and persistent symptoms in primary anemia and should be considered for this reason if for no other, but it is also an early symptom in cases exhibiting malignant conditions. Therefore, cases exhibiting both achlorhydria and chronic fatigue should be considered as possible early cases of either primary anemia or malignancy.

CONCLUSIONS

Since a chronic gastritis is probably responsible for the greater number of cases of achlorhydria, it would seem that every effort possible should be made to relieve the trouble before the secretory glands of the stomach are destroyed. If this can be accomplished, the individual may be protected from some of the pathologic conditions discussed, and certainly an improved gastric digestion and a better condition of the health, generally, will result.

Much may be done in the way of relieving the cause of the gastritis by destroying foci of infection: diseased tonsils, chronic sinus infection, and apical disease of the teeth. The diseased appendix has also been mentioned as a possible cause of chronic gastritis. Since gastritis, both acute and chronic, may result from acute infections, such as scarlet fever and measles in children, and influenza, typhoid or other acute infections

14. Wilkinson, J. F., and Oliver, T. H.: Some Clinical Conditions Associated with Achlorhydria, Lancet **1**: 66 (Jan. 10) 1931.
15. Cheney, W. F.: Diseases of the Stomach and Intestines, in Oxford Monographs on Diagnosis and Treatment, New York, Oxford University Press **2**: 103, 1928.
16. Moynihan, B.: Cholelithiasis, Brit. M. J. **1**: 393 (Feb. 28) 1925.
17. Faber, K.: Berl. klin. Wchnschr. **50**: 958, 1913.
18. Borries, G.: Deutsches Arch. f. klin. Med. **120**: 216, 1910.
19. Lottrup, M. C.: Chronic Arthritis, Gastric Achylia and Anemia, Ztschr. f. d. ges. phys. Therap. **38**: 10 (Dec. 4) 1929.

in adults, greater care must be exercised, in the management of the infection, to avoid such complications if possible.

Careful regulation of diet to avoid irritation, attention to the vitamin content of the food, and the restriction of alcohol, tobacco and irritating drugs may be of decided value in restoring the inflamed mucous membrane to a normal state. Rapid eating and the use of too hot or too cold foods, especially in the young, may be a frequent cause of gastritis. The excessive use of sweets or soda fountain beverages is also a potent factor. Whereas the saloon was formerly supposed to be a great factor in destroying the digestive glands, it is not certain that the soda fountain of today may not be equally destructive.

There may be some difference of opinion as to the medicinal measures which are valuable in these cases. Probably dilute hydrochloric acid, either with or without the gastric ferments, has been the preparation of choice. If used with the idea that it will supply the hematopoietic substance secreted by the normal mucous membrane, it is probably of little if any value, but in many clinical cases exhibiting achlorhydria its value is apparent by the improvement in the patient's condition. This is particularly true in early cases of gastritis, in which it seems to be of great value in association with other measures in checking the pathologic process. Whether it is by activating the pepsin, or by providing a stimulus to the secretion of pancreatic juice as suggested by Pavlov,[20] or by partially disinfecting the upper gastro-intestinal tract may not have been definitely proved. According to Crohn:[21]

> Whether the customary, even insufficient, dosage of acid acts to produce a free acid medium during digestion or not, the empirical fact remains that the clinical symptoms show evident improvement. The gastric symptoms are alleviated and the diarrhea is often successfully held in check. The hurried gastric emptying is delayed, the pyloric reflex strengthened, and the resultant diarrhea is beneficially affected.

It is prescribed as a routine measure in all of our cases exhibiting a definite absence of free hydrochloric acid. We are of the opinion that it may be given in capsules, as now provided by some chemical firms, in preference to its use as a lemonade, which may have deleterious effects on the teeth. We find but little indication for the addition of pepsin to the hydrochloric acid, as it is completely absent in so few cases. It is of little value to attempt to increase the gastric secretions, as was formerly the vogue, by means of bitter substances—quinine, strychnine, gentian—and the practice of prescribing these drugs for direct effect on the gastric mucosa is practically obsolete.

The use of heat as a hydrotherapeutic measure, by means of fomentations, the electric pad or diathermy is of exceptional value in cases presenting epigastric pain after meals and in cases exhibiting a pyrosis or tendency to regurgitation of food.

Gastric lavage is a measure that has been largely discarded by the profession, but in chronic gastritis it might be used advantageously in selected cases. Hurst[8] advises its use with a solution of hydrogen peroxide, which he believes is of decided value in relieving the stomach of mucus. An inflamed mucous membrane may produce a large amount of mucus which, in cases of subacidity, neutralizes the small amount of acid secreted. After a lavage which frees the stomach of mucus, hydrochloric acid is present, although previously a diagnosis of achlorhydria may have been made.

While acute cases show marked improvement following rational therapeutic efforts, chronic cases do not respond so well, but we believe that much can be accomplished in the way of temporary relief and possible permanent improvement.

20. Pavlov, I. P.: The Work of the Digestive Glands, Philadelphia, J. B. Lippincott Company, 1910, p. 118.
21. Crohn, B. B.: Affections of the Stomach, Philadelphia, W. B Saunders Company, 1927, p. 391.

SUMMARY

1. Achlorhydria obtains in about 10 per cent of patients presenting themselves for examination in whom gastro-intestinal symptoms suggest gastric analysis.

2. Achlorhydria probably results from a chronic gastritis which in the majority of cases is of hematogenous origin. Alcoholic abuse and the excessive use of tobacco favor a chronic gastritis and should be prohibited in these cases. The excessive use of candy and soda fountain products is definitely to the disadvantage of the young.

3. In achlorhydria a complete absence of the enzymes is rarely found and we have practically discarded the use of the term achylia gastrica. For practical purposes, we do not recommend the use of histamine.

4. In cases of primary anemia, hydrochloric acid is always absent and the enzymes are greatly reduced. It has been suggested that the achlorhydria might be considered a precursor of this condition.

5. The epoch-making work of Castle and his associates appears to prove that in primary anemia there is a disturbed protein digestion which is due, not to the absence of hydrochloric acid or pepsin, but to a probable hypothetic enzyme, which is sometimes absent in cases of achlorhydria.

6. Achlorhydria is found in possibly 50 per cent or more of cases exhibiting gastric malignancy. This is not necessarily a cause of the malignant condition but is secondary to the atrophic gastritis, which by some is supposed to be an etiologic factor in malignant conditions.

7. Achlorhydria is also a frequent symptom in chronic diarrhea, biliary tract disease, chronic arthritis and some cases of secondary anemia.

8. If more consideration could be given to cases of achlorhydria in the early stages of the trouble, it is possible that the gastritis could be relieved, which might allow of a partial restoration of gastric function.

ABSTRACT OF DISCUSSION

DR. CLARK W. HEATH, Boston: Pernicious anemia is only one of the many diseases often associated with achlorhydria. Even in pernicious anemia there may be rarely plenty of free acid present and the gastric juice apparently normal. I studied two such cases—a case of chronic sprue and a case of multiple intestinal anastomoses. Each patient had a typical pernicious anemia blood picture and responded subsequently in normal fashion to liver extract. But when the gastric juice was allowed to act on beef muscle and the product fed to two persons with pernicious anemia, there was no response of the blood, although when gastric juice from normal individuals was given instead the typical signs of remission occurred. In other words, the gastric juice in these two cases did not contain the essential factor, which is present in normal gastric juice. The gastric juice of four patients with a total anacidity, in three of whom there was an anemia of the chlorotic type such as was originally described by Faber and in one of whom there was no anemia, was tested in a similar manner. This gastric juice was just as effective as normal gastric juice in acting on beef muscle to produce remissions in pernicious anemia. Such patients as the last respond well to large doses of iron but respond little, if any, to liver or liver extract. I have seen pernicious anemia accompany cancer of the stomach. In ten cases of complete

gastrectomy recorded in the literature in which the patients survived the operation longer than a year, three cases of pernicious anemia apparently developed. These facts add evidence to the belief that in pernicious anemia there is lacking in the gastric juice a factor which acts on certain substances in the diet to promote normal hematopoiesis. The absorption from the gastro-intestinal tract is another factor in the production of anemia. Keefer has shown the increased incidence of anemia when diarrhea is present. Two persons with pernicious anemia, one of whom did not respond to extract derived from 300 Gm. of liver given daily by mouth and the other to extract derived from 600 Gm. of liver, each responded well to a single intravenous dose of extract derived from only 100 Gm. of liver. As for the etiology of achlorhydria, I am inclined to the hereditary or familial theory in the majority of cases.

DR. B. B. CROHN, New York: I cannot quite agree with Dr. Eggleston in regarding achlorhydria as a "disease." I think it is a mistake to speak of achlorhydria as such when it is a more or less natural condition in 24 or 26 per cent of normal adults. It leads to a misconstruction to speak of it as a disease. It is a functional variation of the gastric secretion. It is probably well within the range of normality and gives rise to practically no symptoms. It has been blamed by neurologists as a cause of melancholia. Hysteria has been attributed to achlorhydria, and also glossitis. It seems that in almost every disease in which the etiology is obscure some one has discovered an incidence of achlorhydria and has thought that this must be the determining factor. Achlorhydria is just a normal physiologic fluctuation of the gastric secretion and in itself should never be interpreted as a disease. Achylia gastrica, however, is entirely different, leading definitely to certain pathologic changes, of which the one outstanding characteristic is primary pernicious anemia. The subject of chronic gastritis is receiving attention all over the world; it is a subject of which more will be heard in the near future. But to what extent chronic gastritis (as evidenced by definite pathologic changes) means anything is as yet an open question. I cannot conceive of small histologic changes such as occur with advancing age as being evidence of an actual disease process which leads to clinical symptoms. I am inclined to believe that the subject of chronic gastritis will be again much overdone. I was interested in Dr. Comfort's remarks about only 20 per cent of achlorhydria following the operation of subtotal gastrectomy. We now have at Mount Sinai Hospital a history of about 600 cases of partial gastrectomy running from ten to fifteen years. We have yet to see our first case of pernicious anemia, in spite of the fact that all the cases of gastric ulcer in which subtotal gastrectomy has been performed have resulted in achylia.

DR. HENRY A. RAFSKY, New York: One must realize that the achlorhydria, as well as extreme degrees of hyperchlorhydria, are compatible with normal health. As important as it is to differentiate between so-called normal and abnormal achlorhydria, so much more important is it to differentiate between primary and secondary achlorhydria. Repeated examination of the gastric secretion, blood examination, and roentgen examination have to be performed before one can determine whether a clinical picture is due to persistent absence of hydrochloric acid, or whether the latter is part of a clinical picture due to a malignant condition or pernicious anemia. I wish to emphasize the fact that statistics vary as to the relationship of achlorhydria to advancing age. Dr. Vanzant has been mentioned. He has recently reported a large series of cases showing that the percentage of true achlorhydria increases as individuals near 60 years. Bell of London does not conform to this theory that advanced age is accompanied by a tendency to atrophy of the gastric tubules and diminished gastric secretion. He found hyperchlorhydria more pronounced after 40. Kruger and I, studying the gastric secretion in a series of seventy-five cases at the Home of the Daughters of Jacob, in old people, the youngest of whom was 70 and the oldest 91, found true achlorhydria in only 1 per cent of the cases. This is contrary to the usually accepted observation. We did our gastric analysis by the fractional method. These patients were as nearly normal as old people can be.

DR. A. C. IVY, Chicago: During the past seven and one-half years I have gastrectomized twenty-eight dogs which have survived the operation longer than one month. Of the twenty-eight, fourteen have survived from six months to six and one-half years. Of the fourteen, three have developed a spontaneous secondary anemia. I have made observations on four female gastrectomized dogs, some of which were pregnant once and others as many as four times. A secondary anemia developed with each pregnancy. I believe that that is a significant observation. This question has bothered me a great deal: Why doesn't anemia develop in all cases of achlorhydria or achylia? The following explanation has occurred to me as being reasonable: One may look on digestion as it occurs normally in the alimentary canal as 100 per cent, and one may state empirically that a factor of safety is present. Now, if the stomach is removed, all or considerable of the factor of safety may be removed. The animal may go along without developing anemia. But, just as soon as some extra strain, pathologic or physiologic, enters there is no factor of safety to compensate and anemia results. Thus, in achylia patients without anemia, the factor of safety is still adequate, their intestinal digestion is sufficient; but in achylic patients with anemia, the loss of gastric digestion has abolished their factor of safety or their intestinal digestion is not sufficient to meet their body needs. The evidence which I have to bring forward in support of this explanation is that one can control the anemia that develops in these achylic dogs by giving large doses of cod liver oil by mouth, or of the secondary anemic factor in liver, plus iron, subcutaneously. In regard to the iron, I believe one might get results by giving large doses by mouth; but since it is difficult to get the dogs to take large doses of iron, the ferric citrate is given subcutaneously.

DR. MARTIN E. REHFUSS, Philadelphia: Some years ago I made studies on 200 men for more than eight years. I found that the average total acidity could be represented in cereals at about 70 to 80. If one studies milk, the incidence approaches 80 to 100, and when one tries meat, one gets a total acidity of beef at about 120. In other words, stomachs which show an achlorhydria with an Ewald meal will not show this condition with a meat meal in many instances; therefore the first suggestion I have to make is the thought that, when there is an achlorhydria with an ordinary Ewald meal, one should test with histamine and at the same time with a particular group of meat products. I was amazed to find figures as high as 130 in health and that made me believe there was no such thing as true hyperacidity. With regard to achylias: I am not speaking from statistics, but I believe that the congenital idea is not as sound as we are taught to believe. Years ago I studied a number of men after an influenza epidemic, and almost all of them had achlorhydria. I made secretory studies in acute pneumonia and typhoid, and in groups of acute infections, and in many of them there is a temporary condition which approximates the thing Dr. Eggleston speaks of; therefore, I believe that one should look at this as an expression of an altered mucous membrane of the stomach. If I make the same observations day after day, I am led to believe that there is some organic impairment of the mucous membrane of the stomach; and if I get a negative roentgenogram showing no organic disease in the stomach wall, I look further into the cause of that particular observation. My attention in the last few years has been attracted to the question of the sinuses because in so many of these cases there is sinus involvement. When one puts the tube in the fasting stomach, there is mucopus in the stomach, which doesn't come from the stomach wall. Presumably it is swallowed mucopus because it is frequently aerated and not intimately mixed with the gastric contents and there is a purulent lesion somewhere above that tract and that lesion may be tonsillitis or sinusitis, and in many instances it is a pulmonary lesion. Many of these people for years have swallowed that sort of thing and the result is that they have a low grade chronic gastritis.

DR. ELMER L. EGGLESTON, Battle Creek, Mich.: Many of the points which I attempted to bring out in the paper have been more satisfactorily brought out by the discussers. I am sorry if I left the impression, as Dr. Crohn has suggested, that achlorhydria is a disease; nevertheless, one must conclude that it is a symptom of a pathologic condition. My impression is that a gastritis obtains which in the majority of cases is respon-

sible for the achlorhydria, and this might be considered the pathologic condition. The idea that I wished to bring out in this paper was that the individual with achlorhydria is not normal from a health standpoint. He must be carefully watched, as achlorhydria is a warning that a possible pathologic process obtains which if not checked may later become serious. A gastric analysis, if made, should warrant careful attention of the results. As Dr. Ivy has remarked, the individual exhibiting an achlorhydria is highly susceptible to certain diseases. His resistance has been definitely lowered and he is entitled to careful observation. The question of Dr. Rehfuss relative to achlorhydria obtaining in 10 per cent of patients exhibiting gastro-intestinal symptoms as being a little too high would warrant my repeating that this has been found in a large series of cases by a number of observers. In canvassing some 4,000 cases that had been studied with the fractional test meal, this was the percentage observed. With the Ewald meal I found a much higher proportion, as high as 18 per cent exhibiting achlorhydria at the end of an hour. It is true that not all these cases were studied after the use of histamine and I am not reporting them as true cases of achlorhydria; nevertheless, one must recognize that these individuals exhibit abnormal digestive secretions and that the protein digestion may be definitely subnormal. It is largely for this reason that one should do everything possible to protect them from injury which may result because of this.

PROSTATIC OBSTRUCTION

ELECTROCARDIOGRAPHIC STUDY OF THREE HUNDRED AND TWENTY-ONE CASES: A FURTHER REPORT *

CHARLES M. BACON, M.D.
HERMAN L. KRETSCHMER, M.D.
CHICAGO
AND
LEWIS W. WOODRUFF, M.D.
JOLIET, ILL.

The frequency with which surgery is required in men past middle life with benign hypertrophy or carcinoma of the prostate renders of prime importance an accurate appreciation of the condition of the heart. This study, which is a continuation of a previous report,[1] aims to determine the incidence and the predominant types of heart disease in these patients and is based on a careful analysis of 321 unselected cases of prostatic obstruction.

Chronic myocardial degeneration, accompanied usually by arteriosclerosis, was the predominant type of heart disease in 115 cases. There were two cases of syphilitic aortic disease, one with aortic regurgitation and one with aneurysm. There were three of mitral regurgitation which may have been due to rheumatic fever. Willius[2] in 1925 at the Mayo Clinic, in a similar study of 705 cases, found only 7 with rheumatic valvular lesions. The absence of very few frank cases of rheumatic heart disease is not surprising, since those individuals so rarely reach the age of 50. Of the types due to vascular changes, there were eight with angina pectoris and six with unquestioned coronary thrombosis. There were ten patients with auricular fibrillation and three with flutter. Only six had unmistakable signs of cardiac decompensation.

The age distribution of these patients and the number with myocardial disease and left axis deviation in the electrocardiogram appear in table 1.

Of the 227, or 70 per cent of the total, between the ages of 60 and 80, 39.2 per cent showed definite evidence of myocardial disease. Willius[2] reports 42 per cent with cardiovascular disease in his series.

The frequency of left axis deviation or preponderance of the left ventricle may be due to moderate degrees of left ventricular hypertrophy produced by

TABLE 1.—*Age Distribution*

Age	Number of Cases	Per Cent of Total	Patients with Left Axis Deviation		Patients with Heart Disease	
			Number	Per Cent	Number	Per Cent
44–49	16	4.9	7	43.7	3	18.7
50–59	68	21.2	34	50.0	19	27.9
60–69	127	39.6	80	62.9	48	37.8
70–79	100	31.2	67	67.0	41	41.0
80–86	10	3.1	5	50.0	4	40.0
	321	100.0	193	60.1	115	35.8

increased peripheral resistance which is the result of vascular disease; or it may be due to changes in the position of the heart, the most common cause of which is obesity.

The systolic blood pressures of these patients grouped for each 20 mm. of mercury is listed in table 2.

From table 2 it is seen that there is a greater frequency of the higher systolic blood pressures in the groups showing myocardial changes than in the corresponding groups without apparent heart disease.

Syphilis seemed to be of little importance in this group, for of 292 blood Wassermann tests only 6, or 2 per cent, were positive. Only one of these patients had syphilitic heart disease, and in none did the disease affect the operative risk.

An electrocardiogram was done in every case in order to determine the value of this procedure in indicating the condition of the heart muscle. The diagnosis of myocardial damage was based on definite slurring or

TABLE 2.—*Systolic Blood Pressures*

Systolic Pressure	Without Heart Disease		With Myocardial Disease	
	Number	Per Cent	Number	Per Cent
80–99	..	....	1	0.8
100–119	42	21.5	10	9.5
120–139	83	43.0	33	31.4
140–159	43	22.0	32	30.5
160–179	17	8.2	11	10.5
180–199	7	3.5	10	9.5
200–219	2	1.0	2	1.9
220–239	1	0.5	3	2.8
240–259	..	....	2	1.9
260–279	..	....	1	0.8
	195		105	

notching of the Q-R-S waves in at least two leads, prolongation of the Q-R-S beyond 0.1 second, or inversion of the T wave in leads 1 or 2.

Of the 115 patients with myocardial disease, 90, or 78 per cent, had abnormal electrocardiograms. The value of this observation was demonstrated in a number of cases in which the clinical examination showed an apparently normal heart while the electrocardiogram gave evidence of myocardial changes. This test, as recommended by Smith,[3] is of considerable aid in the cases in which there is a question before operation of cardiac disease.

* From the Presbyterian Hospital of Chicago and the A. D. Thompson Fund, Rush Medical College of the University of Chicago.
* Read before the Section on Practice of Medicine at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 10, 1931.

1. Bacon, C. M.: Kretschmer, H. L., and Woodruff, L. W.: J. Urol. **25**: 335 (March) 1931.
2. Willius, F. A.: J. Urol. **13**: 337 (March) 1925.
3. Smith, G. G.: The Circulation as a Factor in Prostatic Surgery, J. A. M. A. **89**: 925 (Sept. 17) 1927.

In the preparation of these patients with heart disease for prostatectomy, rest in bed is essential until the cardiac function is improved. Next in importance, urologists have for many years stressed the fact that the intake of fluids be increased in order to combat infection, to treat the impaired renal function and to relieve the extreme dehydration. It is not uncommon to give as high as 6,000 or 7,000 cc. of liquids daily by mouth, by the rectum and subcutaneously. Although the administration of such large amounts of fluids is of great value, the quantity should not be so large as to embarrass the heart in patients with myocardial disease.

The decompensated cases require long periods of rest in bed with maintenance doses of digitalis. Slow decompression of the bladder in acute retention is even more important in these cases than in the ordinary ones. Since the blood pressure continues to fall for some time after drainage is started, frequent observations should be made before operation to be sure that the pressure is maintained at a constant level.

Although opinions differ as to the best anesthetic to be used in these patients, we have obtained the most favorable results with sacral anesthesia. This method does not produce the marked fall in blood pressure obtained in spinal anesthesia, nor does it produce the cardiac embarrassment or respiratory complications associated with ether, ethylene or nitrous oxide.

Certain individuals with severe decompensation can never be brought into condition for second stage prostatectomy, although they may be considerably improved following cystotomy and catheter drainage. The following report illustrates such a case:

CASE 1.—A man, aged 82, complained of frequency, burning and pain on urination and occasional hematuria of ten years' duration, and for two weeks difficulty in voiding, requiring frequent catheterization. There were no complaints referable to the heart and no previous illnesses except pneumonia thirty years before. Examination showed the heart markedly enlarged to the left, no murmurs, and an occasional extrasystole. There was no peripheral edema but there were râles in the chest. The blood pressure was 130 systolic and 55 diastolic. The prostate was moderately enlarged and a large bladder diverticulum was visualized on the cystogram. Roentgenography showed lumbar vertebral arthritis and considerable calcification of the arteries. The electrocardiogram showed a regular rhythm with left axis deviation, a negative T wave in lead 1 and slurring of the Q-R-S waves in leads 2 and 3. Cystotomy and resection of a large diverticulum was performed, following which the patient progressed favorably for three weeks, when a marked irregular rhythm was observed. The electrocardiogram showed an auricular flutter wth an auricular rate of 300 and a ventricular rate of 150. The patient was then put on digitalis and at the end of two weeks normal rhythm was resumed. At this time a left sided hemiplegia occurred, probably due to a cerebral embolus occurring with resumption of sinus rhythm. The patient then gradually improved, leaving the hospital seven weeks after operation. Because of this stormy postoperative course due to the bad cardiac condition, it was evident that a second stage prostatectomy would be hazardous at this time. We are still awaiting cardiac improvement before attempting further surgical procedure.

There were four postoperative deaths directly due to heart disease. Two of these were cases of coronary thrombosis, of which one had shown definite evidence of severe myocardial damage, so that the sudden termination was not unexpected, although this did not occur after the prostatectomy but following repair of the suprapubic fistula thirty-seven days later. The other was entirely unforeseen, as the patient gave no evidence of heart disease either on physical examination or in the electrocardiogram. The patient had a sudden attack of epigastric pain with shock two weeks after the first stage and died three days later. A third patient who gave no complaints or physical signs suggestive of heart disease, but had in the electrocardiogram an inverted T wave in lead 1, died twenty hours after a diverticulectomy from sudden myocardial failure. The fourth death occurred eighteen hours after median bar excision in a man who had evidence of long standing rheumatic heart disease with definite myocardial changes, although he appeared to be in good condition at the time of operation.

The case histories of those dying after operation as a result of cardiac disease may be thus summarized:

CASE 2.—A man, aged 76, complained of nocturia and burning for one year and of retention of urine requiring frequent catheterizations for nine months, with a good deal of pus and occasional blood. Up to this time, except for a marked tremor for many years, he had been in excellent health, carrying on active physical exercise, including mountain climbing for two or more hours daily. Lately he had noticed a dull ache in the anterior region of the chest, especially with the pain produced by the insertion of a catheter. Slight swelling of the feet had appeared at times. There was no dyspnea or cough. The past history was irrelevant.

Examination showed the heart slightly enlarged to the left, an occasional extrasystole, and the radial arteries slightly beaded and thickened. The prostate was much enlarged. The blood pressure was 152 systolic and 78 diastolic. The electrocardiogram showed slight left axis deviation, slurring of the Q-R-S waves in leads 2 and 3, and evidence of myocardial damage.

Suprapubic cystotomy under sacral anesthesia was done twelve days after admission to the hospital, following which he did well. Nineteen days later, under sacral anesthesia, the prostate was removed with little bleeding. He recovered so that he was up and about in two weeks. Five weeks after prostatectomy, repair of the suprapubic fistula was done under ethylene anesthesia. Six hours later he died very suddenly, gasping for breath. Autopsy showed an old thrombus in the anterior descending branch of the left coronary artery and a recent thrombus in the circumflex branch. There were multiple scars in the left ventricular wall and marked generalized arteriosclerosis.

The observations made at autopsy confirmed the results of the electrocardiographic study of this case. This weakened myocardial condition predisposed the patient to the second thrombosis in the circumflex branch, which resulted in death.

CASE 3.—A man, aged 74, was admitted to the hospital complaining of marked frequency, urgency and difficulty in urinating. He gave no symptoms referable to the cardiovascular system. He had always been in good health. The heart appeared normal to physical examination. The blood pressure was 158 systolic and 78 diastolic. The electrocardiogram showed moderate left axis deviation and a low voltage of T in all leads, the greatest being 0.1 millivolt in lead 1. Cystoscopy showed marked prostatic hypertrophy with a large middle lobe and a bladder stone. Suprapubic cystotomy under sacral anesthesia was followed by a satisfactory postoperative course without unusual complaints. On the fourteenth day he was seized with excruciating pain in the epigastrium and went into profound shock with dyspnea and cyanosis. His blood pressure on the following day was 90 systolic, 54 diastolic. The electrocardiogram showed a depressed S-T interval in lead 1 and a raised S-T with a "cove plane" T in lead 3. The patient died on the third day after the accident. Although no autopsy could be performed, clinically death was due to a coronary thrombosis.

CASE 4.—A man, aged 63, complained of frequency, pain and difficulty in urinating for three or four years. He had had several attacks of complete retention of urine for which he had had bladder irrigations. There were no cardiac symptoms such as shortness of breath, edema or cough. Examination of the heart revealed a slight accentuation of the aortic

second sound and no apparent enlargement. Rectal examination showed an enormously enlarged prostate. Cystoscopic examination showed a severe generalized cystitis, intravesical hypertrophy of the prostate and the opening of a diverticulum. The blood pressure was 174 systolic and 100 diastolic. The electrocardiogram showed a negative T in lead 1 and notching of the Q-R-S waves in leads 2 and 3 indicating probable myocardial changes. The patient was given preliminary catheter drainage for two weeks with irrigations. The infection rapidly cleared up and he was subjected to diverticulectomy. Following the operation, he went into profound shock. His pulse when he returned from the operating room was 160 and very weak, and his blood pressure was 40. Pulmonary edema and cyanosis developed rapidly, followed by death twenty hours after operation.

CASE 5.—A man, aged 69, had had a prostatectomy twelve years previously. Four years later he began to have difficulty in emptying the bladder, requiring the frequent use of a catheter for the past eight years. A suprapubic fistula had been present for four months. Fifteen years ago he had had rheumatism resulting in a valvular heart lesion. Slight exertion caused dyspnea and some palpitation, but there was no edema or precordial pain. Examination of the heart showed the left border 13 cm. from the midline in the fifth interspace, the right border 3 cm. in the fourth interspace. A loud systolic murmur was heard over the entire precordium, most marked in the tricuspid area. The blood pressure was 125 systolic and 75 diastolic. Cystoscopic examination showed a severe generalized cystitis with a median bar and a large left lobe of the prostate. The electrocardiogram revealed marked left axis deviation with an inverted T wave in lead 1. After two weeks of drainage and irrigations of the bladder a middle lobe excision was done under sacral anesthesia. Following operation there was vomiting all day and in the evening. The pulse became more rapid and weaker. Dyspnea and cyanosis gradually became more marked with irregularity of the pulse and respiration. Death occurred about eighteen hours after operation.

A fifth patient had a very difficult time following operation because of heart disease but recovered:

CASE 6.—A man, aged 61, complained of difficulty, frequency and urgency in urinating for eight years, getting gradually worse. There were no complaints of dyspnea, edema, precordial pain or palpitation. The heart was apparently not enlarged though the chest was barrel-shaped. The peripheral vessels did not seem sclerotic. The blood pressure was 150 systolic and 88 diastolic. The electrocardiogram showed auricular extrasystoles and marked left axis deviation. The prostate was greatly enlarged. Prostatectomy was done under sacral and local anesthesia, after which the patient did fairly well until the fifth day, when he developed marked dyspnea, cough and a dependent edema. The heart became enlarged, very rapid, with a rate of 154, and an absolute irregularity. An electrocardiogram showed an auricular fibrillation. There were many moist râles in both lungs. Digitalis was given by hypodermic injection, after which he improved gradually with restoration of a regular rhythm on the fifteenth day. From this time on his recovery was uneventful and he was discharged thirty-seven days after operation. When seen two months later he was in good condition except for slight edema of the ankles.

This case illustrates the value of careful postoperative observation and treatment under the supervision of a competent medical man.

From a review of these histories it is evident that the most important consideration from the cardiac standpoint is the recognition of the presence of heart disease by the use of all diagnostic methods available. When surgery is necessary in these individuals, every precaution may be taken and a sudden fatal termination will not be unexpected and will occasionally be avoided.

A postoperative study of a group of these patients was made to determine whether there was any improvement of the heart after prostatectomy. As a result of relief from infection, freedom from pain, and the disappearance of night urination insuring more complete rest, it might be expected that the cardiac condition should improve.

Of forty-seven men returning for observation between six months and two years after operation, there were thirty-two who were free from cardiac disease at the time of their previous admissions. Five of these have developed definite myocardial disease, demonstrated in four by electrocardiographic changes, a marked rise in blood pressure in two, and increased cardiac enlargement and subjective symptoms of circulatory embarrassment in two. The remaining twenty-seven are in good health. Of fifteen with myocardial disease at the time of their first admission, eight are now definitely improved. In five of these there is a marked decrease or absence of previous edema. Two others are definitely worse. In three with auricular fibrillation the arrhythmia remained unchanged. In general, considerable improvement is apparent from the cardiac standpoint in these patients, mainly evidenced by relief from subjective complaints, such as decrease in dyspnea and edema, but with few changes in the physical or electrocardiographic observations.

SUMMARY

A study of 321 cases of prostatic obstruction demonstrates the frequency of myocardial disease. There were 35.8 per cent with heart disease in the group of all ages.

The frequency of left axis deviation and myocardial disease in relation to age shows a progressive increase in these conditions with advancing years.

Of a total of 115 with heart disease, 90, or 78 per cent, showed abnormal electrocardiograms.

The preoperative and postoperative care and choice of anesthetic in patients with cardiac disease is necessary.

The four postoperative deaths due to heart disease are analyzed.

A series of forty-seven patients returning some time after operation show in general considerable improvement in cardiac function as a result of the relief obtained by surgery.

CONCLUSIONS

The electrocardiographic study emphasizes the value of recognizing preoperatively the presence of cardiac disease in patients with prostatic obstruction irrespective of clinical cardiac signs. The electrocardiogram is, however, an aid, not the final criterion, in the diagnosis of myocardial disease.

ABSTRACT OF DISCUSSION

DR. L. F. BISHOP, JR., New York: There is no more difficult question than when an internist has under his care an individual suffering from a poor myocardium, and this individual either suddenly or slowly develops a prostatic condition and becomes a combined cardiac and urologic problem. For example, a case I have seen recently of a man, aged 64, who had at least two definite attacks of coronary thrombosis and had been under my care for a number of years, suddenly developed, with little previous trouble, an acute retention. I was therefore confronted with the problem of whether he is to have a prostatectomy or to be dependent for the rest of his life on a catheter, with possible subsequent infection. A prompt and skilful operation by a colleague of mine resulted in a restoration of the bladder function. It is questions like these which Drs. Bacon, Kretschmer and Woodruff have helped us to answer. It is probable also that chronic urinary retention with resulting renal changes is an important factor in enhancing

the progress of a mild or latent degenerative cardiovascular lesion. Patients with distinct urinary retention who, without operation, would of necessity have to resort to a catheter, should be given the opportunity of surgical intervention provided the cardiac condition can be restored sufficiently to permit the operation to be performed with reasonable safety. I can only agree that the electrocardiograph is but one means of determining cardiac efficiency. In regard to the disappearance of arrhythmias, in the case reported there was present an extrasystolic arrhythmia which disappeared following prostatectomy. Other men have reported the disappearance of arrhythmias following prostatectomy.

THE TREATMENT OF POLIOMYELITIS

JOHN RUHRÄH, M.D.
BALTIMORE

Poliomyelitis is a disease that is on the increase, but, despite the number of cases seen, the early diagnosis is not made as frequently as it should be, and, judging from the late results, proper remedial measures are often neglected.

The early treatment should be by the injection of convalescent serum or that taken from patients who at some time have had the disease. Stocks of this serum should be kept on hand by health departments, hospitals and similar institutions. Divided into proper doses, placed in small bottles and dried, it keeps practically indefinitely, and all that is needed is to add sterile water to it to make up the required amount.

During the febrile period all efforts at treatment should aim to make the patient as comfortable as possible, using the technic which would be applied to any acute infection. Rest is essential and the late results are best when that is insisted on, whether the case is mild or severe. The patient should be kept in bed as long as there is pain, but during this period it may be advisable to lift him to another bed or comfortable chair while the bed is aired or made. This change is often most grateful to the patient and if it can be done without undue pain or fatigue apparently does no harm. When the legs are affected the patient should be kept either in or on the bed for at least six months and longer in many cases, as I shall outline in considering fatigue. Too early use of the muscles, overuse and overfatigue definitely do harm either by prolonging convalescence or by more or less permanently damaging certain muscle groups.

Pain may not be present, may be trifling or mild or may be of a very intense grade. There is a fixed idea in the minds of both the public and the profession that poliomyelitis is a painless disease, and many incorrect diagnoses of rheumatism, arthritis, neuritis, and the like are made in consequence.

Pain may be due to involvement of the posterior nerve roots and sensory nerves; to contractions in the muscles; to changes in and about the joints; to fatigue. The first named is the worst and when combined with muscular contraction gives the patient the sensation of fifty million little devils armed with red hot pincers twisting the individual muscle fibers while a like number with red hot skates formed like cockleburs skate about the joints and fasciae. This pain requires sedatives; depressants should be avoided and opium derivatives should be used with caution. The pain due to contractions is best treated by immobilization by applying light plaster casts and cutting them so that the patient or the extremities may be lifted out for bathing, massage, manipulation and rest. Various splints may be used, but casts are as a rule more satisfactory. The relief from pain follows as soon as the muscles quiet down and the patient becomes adjusted to the appliance. The same treatment is used for pain about the joints. The pain of fatigue due to being in one position a long while is usually noticed more in patients whose affected parts are not immobilized and may be relieved by changing the position or, if the patient is not tender, by light massage or passive movements.

General muscular tenderness requires as little touching and handling of the patient as possible and when a trained nurse is out of the question, a few lessons in handling such patients should be given the attendant.

Any muscle that is put on a stretch is liable to be damaged, and this may lead to permanent disability of such a muscle. This is most true of the deltoid, and if involved the arm should be kept on pillows either with or without bandages to keep it well up at least part of the day. As soon as the patient is up, the arm should be kept in an airplane splint if the patient is moving about or on an arm rest at right angles, placed on the arm of the chair.

Failure to prevent deformities due to contraction of the muscles, tendons and fasciae is the greatest sin of omission. The contractions take place very quickly; a week or ten days' neglect may result in a foot drop which may cost the patient much pain and the physician much trouble. No patient with extensive paralysis escapes without contractions, but they should be kept at a minimum by care and treatment. If they occur they should be treated as early as severe pain permits; no contraction can be stretched without pain to the patient, who may be truthfully assured that the pain used in preventing and correcting contractions is nothing compared to what must be experienced if the contraction is allowed to go untreated until it gets so bad as to require forcible stretching with or without an anesthetic or an operation.

Immobilization in the correct position takes care of part of this; massage and passive motion of as much of the remainder as is amenable to treatment. Every day the patient should have the immobilizing apparatus removed, the parts bathed, rubbed with alcohol, powdered and passive movements made in all directions. If there is severe nerve pain and the patient is extremely sensitive to all manipulation and even to touching, this may be reduced to a minimum and in some cases even omitted altogether except for cleanliness. As long as the muscles are tender to touch, massage should be omitted entirely or only such light massage used as is pleasant and not painful. It often requires considerable discrimination in nervous patients to tell what is psychic or complained of through fear of being hurt, but careful observation will generally allow the distinction to be made with reasonable certainty.

As power returns the patient will move about of his own accord, but he should not be allowed to overdo this. At first the movements should be partly voluntary and partly assisted by the physical therapist. Fatigue should be avoided; too little treatment of this kind during the first six months is better than too much, and in fact at any time. The patient is usually overanxious to do and the physical therapist to get results, until the patient relapses through fatigue. The best method is to use a movement or two a day at the beginning and increase gradually to five and then to ten such movements at a treatment. Later the patient may make such voluntary motions as may be possible under supervision to see that he is exercising the proper muscles

and not substituting other muscle groups to do the work. As the extremity becomes functionally capable, ordinary movements such as walking should be systematically carried out in the same manner.

The most useful suggestion concerning exercise has grown out of the recent Georgia Warm Springs Foundation work, where under Dr. LeRoy Hubbard a system of after-treatment has been developed. This consists in graded exercises given by trained physical therapists for the most part while the affected part is submerged in water at a temperature of about 90 F.

As Archimedes pointed out, the body is as much lighter in water as the volume of fluid it displaces. Under water, muscles that are useless in the air may be moved, and daily exercise properly directed enables the patient to secure a maximum development of any muscle which has any innervation left. Swimming is often possible even when the patient is badly damaged, and there is no better exercise for stimulating the growth of the muscle and for developing coordination. The mental stimulus from the association with others similarly handicapped is of great value in creating and maintaining the morale of the patient. The results are often surprisingly good.

Fatigue is to be avoided. All poliomyelitis patients are unusually subject to tire, and nothing can be more destructive both to muscle power and to morale. It may be local in a group of muscles and lead to pain, atrophy, loss of power or a neuritis with pain and a recurrence of the paralysis either partial or complete. It may be general, a complete nerve exhaustion causing the patient to lose time and adding to his discomfort.

In local muscle group fatigue the patients may or may not have a warning before the worst effects are manifest. Usually some degree of local fatigue is present, which only too often is overlooked in a desire to do or to keep up with others who are stronger.

General fatigue almost always comes on without any warning, or the danger signals are so slight as to be disregarded by the patient and his advisors. It is as if a man had a sum of money in the bank and checked on it without any accounting; some day without warning the bank sends notice of no funds. So in poliomyelitis a general tiredness may supervene in a patient who thought he was doing unusually well. Rest in bed, pleasant light diversion to fill the long and tedious hours of enforced idleness, which only too often destroy the patient's morale, and carefully regulated massage, good food and general care are the indications—all of great importance. Only too often are such patients put to bed to stew and fret mentally when a little sensible diversion would avoid much suffering.

One sign of undue fatigue, which has been carefully followed in only one case but which should receive careful study by those so situated as to make the necessary observations, is the increase in the volume of urine, especially of the nocturnal urine, for several days before there is any realization of fatigue by the patient. The output returns to normal as soon as the patient is rested.

SUMMARY

The treatment of poliomyelitis after the febrile period consists in rest, relief of pain, prevention of deformity, massage and exercise, which may be passive, assisted, voluntary, carried out under water, but always supervised. The increase in the volume of urine, especially that voided at night, is suggested as a possible indicator of serious fatigue.

11 East Chase Street.

Clinical Notes, Suggestions and New Instruments

BENZOYL PEROXIDE—AN APOLOGY *

PAUL D. LAMSON, M.D., NASHVILLE, TENN.

A year ago I [1] published a note on the use of benzoyl peroxide as a dusting powder in the treatment of poison ivy intoxication, stating that this was a harmless substance, that theoretically it should be of value, being an active oxidizing agent and absorbent and, above all, acting as a local anesthetic which might be of great value in the relief of itching. Benzoyl peroxide has now been given a trial in possibly 100 cases with about the results that might be expected. Unbelievable relief within fifteen or twenty minutes after the application of the powder has been observed in several cases and great improvement in the poison ivy lesion itself. Others report only fair results, while still others state that benzoyl peroxide is entirely ineffective.

The apology that I should like to make is not one regarding the therapeutic value of this substance but for having allowed a dangerous property of this and other organic peroxides, namely, inflammability and explosibility, to have slipped my mind at the time of publication. I must confess the ridiculousness of offering an explosive for general therapeutic use without sufficient warning. Explosive substances, as for example, ether, trinitrophenol and glyceryl trinitrate, are used in medicine but their dangerous properties are generally known. Although I wish to apologize for my mistake, I should like to point out that there was some reason for this apparent ignorance or carelessness on my part. When I first began work in pharmacology a bottle of benzoyl peroxide powder was always kept in the laboratory and used for years as an antiseptic dusting powder in dogs' wounds. As this was in such constant use and as no mention is made of the dangerous properties of this substance in any references to its use in medicine of which I am aware, it was natural to look on it as a harmless substance. However, as the result of a serious accident from the explosion of a peroxide, which happened to one of my friends, I was well aware of this general property of organic peroxides; so much so, in fact, that I consulted a group of chemists before grinding up some granular benzoyl peroxide which we had in the laboratory. They all felt that there was no danger in this particular instance, and we ground up large amounts of it for a year or two before asking a pharmaceutical house to furnish us with powdered material. We never had an accident with this substance in spite of grinding it frequently and carrying it about in all manner of ways during the summer. On account of this continued use of the substance the possibility of its being dangerous went entirely out of my mind.

Immediately after the publication of these observations, however, I was questioned as to how this substance could be sent through the mail because of its explosibility, in spite of having received it up to that time. Shortly after this a man who had powdered his hands well with benzoyl peroxide and then wrapped them up in a bandage lighted a cigaret, which ignited the benzoyl peroxide and burned his hands badly. Because of these properties of benzoyl peroxide it should not be used undiluted as a dusting powder, as under certain conditions of extreme dryness it might become explosive and in any case would ignite if brought in contact with an open flame. As ivy poisoning occurs frequently in children in camps where they are constantly experimenting with fire, it might be a dangerous substance to use in powdered form. It is, however, possible to make a paste of benzoyl peroxide powder and lubricating jelly (containing glycerin), which paste has certain advantages. It is nonexplosive, is no more inflammable than a bandage or other common organic substances, and has the advantage of clinging to the skin, while the powder falls off unless kept in place by a bandage. This paste has been used in a good many cases and about the same percentage of patients have received relief from it as with powdered benzoyl peroxide.

* From the Department of Pharmacology, Vanderbilt University School of Medicine.

1. Lamson, P. D.: Benzoyl Peroxide in the Treatment of Poison Ivy Intoxication, J. A. M. A. 95: 663 (Aug. 30) 1930.

Council on Pharmacy and Chemistry

REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED THE PUBLICATION OF THE FOLLOWING REPORT.

W. A. PUCKNER, Secretary.

OVESTRUMON NOT ACCEPTABLE FOR N. N. R.

Under the proprietary name "Ovestrumon" the Vitalait Laboratory of California, Ltd., market an ovarian extract preparation as "A balanced and standardized extract containing the estrus producing hormone of the ovary plus 25% corpus luteum." The preparation is claimed to be particularly valuable because it contains "the correct balance between the corpus luteum and the follicles" and to be superior to ovary preparations claimed to contain only the ovarian hormone. It is claimed to be "useful in any and all of the symptoms which accompany the menopause."

In the information furnished to the Council it is stated that to prepare the product "fresh glands are extracted, trimmed and adjusted so that the proper proportion of corpus luteum to follicular fluid is arranged"; that a "watery extraction and digestion process is followed by a filtration, after which the extract is deproteinized and the reaction is readjusted." It is stated that the extract is then filtered and one-half per cent of phenol is added; that it is again filtered and then tested biologically, the required standard being not less than 30 Allen-Doisy units per cubic centimeter.

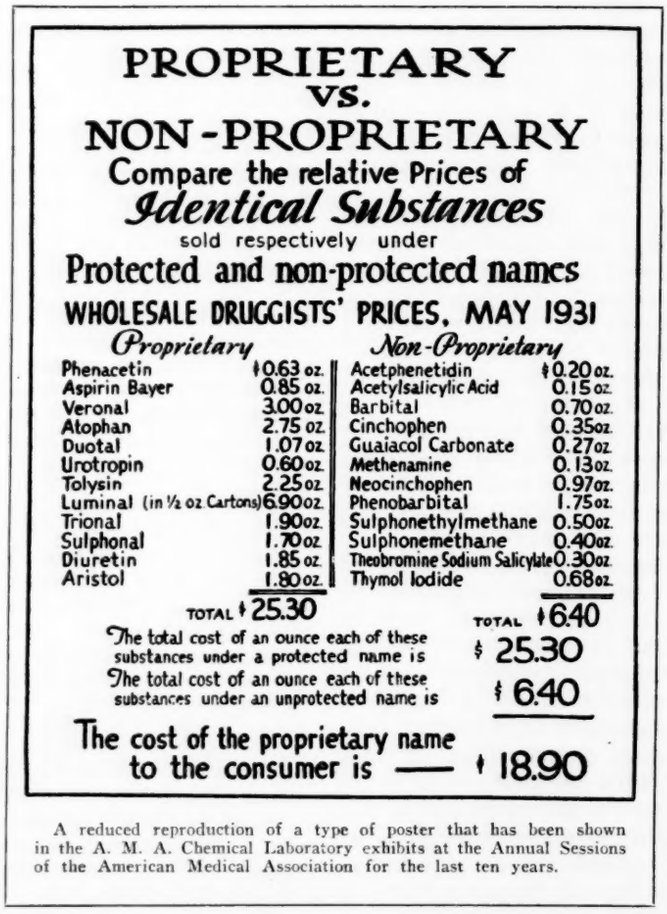
The information received from the Vitalait Laboratory of California, Ltd., was submitted to consultants of the Council for an opinion. In his reply one of the consultants pointed out that the description of the product is too incomplete to permit the formation of any opinion as to the method of preparation. He observes that no one knows what the "proper proportion" of corpus luteum and follicular hormone is, stating that the experiments of Weichert and of Corner both make it likely that in every attempt to imitate the physiologic condition with female sex hormone the so-called follicular fluid should be given for a sufficient period to activate the genital tract before the specific corpus luteum hormone (nidatory hormone) is prescribed. In his opinion the claim that "the correct balance between the corpus luteum and the follicle" is maintained is not warranted. As to the claim that the method of production enables all of the hormones present to be utilized, he stated that this cannot be discussed on the basis of the description of the preparation offered by the firm; as is well known now, it is necessary to extract ovarian material with lipoid solvents to concentrate the female sex hormone and then on the residue to perform an acid-aqueous extraction at low temperature such as was described by Hisaw in order to obtain the nidatory corpus luteum hormone. The information submitted by the firm offers no evidence that these procedures were followed.

A second consultant regarded the marketing of "balanced extracts" as unfortunate, since it is not known whether it is advisable in any case to use the two together. Furthermore, since the term "balanced" appears to indicate a physiologic effect in opposite directions, he questioned how then it would be possible, using the extraction procedure outlined, to ascertain (if balance really exists) the potency of the estrus hormone by the Allen-Doisy assay. He pointed out that the mixing of the follicular with the luteal hormone does not approximate the functions of the human gland except possibly during pregnancy. The consultant stated that there is no scientific foundation for the statement in the firm's advertising concerning the relative proportion of follicle and corpus luteum in fresh ovarian tissue. With regard to the method of preparation furnished the Council, it seemed improbable to the consultant that a single method of extraction would yield appreciable quantities of both the follicular and the luteal hormones. He challenged the statement made by the firm that 0.30 Gm. of fresh tissue will yield 30 Allen-Doisy rat units, stating that he has found only one rat unit per gram of hog liquor folliculi by the same method and that his values are higher than those reported by other investigators.

After consideration of the information submitted by the manufacturer and of the consultants' reports the Council found Ovestrumon unacceptable for New and Nonofficial Remedies.

When the report of the Council's consideration of Ovestrumon was sent to the Vitalait Laboratory of California, Ltd., for consideration, the firm replied that it wished to withdraw the claim that Ovestrumon contains "the correct balance between the corpus luteum and follicles" and to substitute in its place the statement that "Ovestrumon contains corpus luteum and follicular fluid in the proper proportions to produce an extract high in Allen-Doisy units." Regarding the content of "Allen-Doisy units," which had been questioned by the Council, the firm stated that the technician in charge had tested every lot and had accepted none which showed less than 30 Allen-Doisy units per cubic centimeter at the time of ampuling the product. If the technician's assays were correct then it would seem that Ovestrumon rapidly deteriorates with age, for a specimen received from the proprietor when assayed in the consultant's laboratory gave results which indicated that, according to the Allen-Doisy procedure, the preparation contained less than one rat unit per 2 cc. The firm requested the Council to withhold publication of its report until clinical trials that were under way might be completed. It offered to supply the Council with further details concerning the method of manufacture if this would help the firm's case and in the meantime agreed to discontinue active propaganda for its product.

Although ten months have elapsed since the Council's report was submitted to the proprietors, no acceptable evidence for the efficacy of the product has become available. Hence the Council has authorized publication of its report declaring Ovestrumon unacceptable for New and Nonofficial Remedies because it is a preparation of indefinite composition which is marketed with unestablished and therefore unwarranted therapeutic claims and which does not present sufficient originality to be entitled to a proprietary name.



A reduced reproduction of a type of poster that has been shown in the A. M. A. Chemical Laboratory exhibits at the Annual Sessions of the American Medical Association for the last ten years.

Committee on Foods

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

DROMEDARY FRESH KEEPING COCOANUT

(Contains Sugar, Glycerine and Salt)

Manufacturer.—The Hills Brothers Company, New York.

Description.—A moist shredded coconut mixed with sucrose, glycerin and salt.

Manufacture.—Weekly shipments of fresh coconuts in the shell from Trinidad, Jamaica and Porto Rico, but no kiln-dried or sun-dried coconut meat from the Philippines or other points are used in the manufacture of Dromedary Cocoanut.

The nuts are steamed in the shell to facilitate removal of the shell and inner rind by hand and permitting close inspection of the raw nuts. After a second inspection the nuts are washed, shredded mechanically, and mixed with sucrose, salt and glycerin. The mixture is dried in a current of air, sifted to secure shreds of uniform length, dried at room temperature to a moisture content of 5 per cent and packed automatically in wax-paper lined and wrapped cartons.

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture	5.1
Ash	0.8
Fat (ether extract)	41.0
Protein (N × 6.25)	4.3
Reducing sugars as invert	0.8
Starch (acid hydrolysis method)	4.1
Sucrose (by copper reduction)	33.2
Crude fiber	4.1
Carbohydrates (by difference) other than crude fiber	40.4
Glycerin	4.3

Calories.—5.65 per gram; 160.5 per ounce.

Claims of Manufacturer.—A coconut food of good quality.

PABST-ETT

(A Pleasing Combination of "Process" Cheese, Milk Proteins, Milk Sugar, Milk Minerals)

Manufacturer.—Pabst Corporation, Milwaukee.

Description.—A "process American cheese" containing disodium and trisodium phosphates as emulsifiers; with added salt, whole milk and concentrated milk whey.

Manufacture.—American cheddar cheese meeting Wisconsin state standards from cheese factories regularly inspected by state food inspectors is carefully examined for moisture, fat, acidity, taste, odor and general appearance. The acceptable cheeses are stored for aging in clean, dry, well ventilated, sanitary coolers at 7-10 C. until the desired qualities are developed.

Selected aged cheeses are blended to yield a final uniform product of desired flavor, texture and spreading qualities; sharp or mild cheese is worked in in accordance with the requirements of each batch. The selected cheeses are steamed for the removal of paraffin, and the cheese-cloth cover, the outer rind, is shaved off and moldy parts are cut out. The cleaned cheeses are cut up, blended by expert cheesemen, ground, and conveyed to tin lined or stainless steel steam jacketed kettles fitted with mixing devices and a thermometer for control of the temperature of the emulsifying process.

Approximately 50 pounds of ground cheese, the "emusifiers" (disodium and trisodium phosphates) not to exceed 3 per cent of the final product, salt and water are mixed and heated to fluidity. Additional 50 pound quantities of ground cheese are successively added, mixed in and melted until the entire batch charge has been added. The heating and agitation are continued until a temperature of 71 C. is reached, when whey concentrate and evaporated whole milk are added. The semifluid mixture is transferred to automatic filling machines which wrap definite quantities in tin-foil and pack them in paper boxes.

The whey concentrate used is prepared from skim milk by curding with rennin in cheese vats. The whey is separated from the casein and concentrated under reduced pressure to a content of approximately 70 per cent of solids.

The plant and equipment are kept in strictly sanitary condition; the kettles, filling machines, pipes and conveyors are cleansed and steamed each night.

Chemical Composition (submitted by manufacturer).—

	(sample as is) per cent	(moisture free basis) per cent
Moisture	44.0	...
Ash	5.2	9.3
Salt in ash	1.7	3.1
Fat (ether extract)	24.3	43.3
Protein (N × 6.38)	19.9	35.5
Lactose (by difference)	6.6	11.9
Phosphorus (P)	0.33	0.58

Calories.—3.25 per gram; 92.3 per ounce.

Vitamins.—Contains approximately 280 Sherman vitamin A units per ounce, 46 Sherman-Spohn vitamin B (complex) units per ounce, and determinable amounts of vitamin D.

Claims of Manufacturer.—Pabst-ett contains the usual nutrients of ordinary cheese supplemented with milk minerals and other ingredients of milk whey, which valuable nutrients are discarded in cheese manufacture. It is recommended for all the uses of ordinary cheese, is easily spread, and may be used in a wide variety of dishes and recipes.

KELLOGG'S CORN FLAKES

Deliciously Flavored with Malt, Sugar and Salt

Manufacturer.—Kellogg Company, Battle Creek, Mich.

Description.—A cooked and toasted corn flakes cereal flavored with malt extract, sugar and salt.

Manufacture.—Kellogg's Corn Flakes are made from the best grade of white corn. The shelled corn is cleaned, steamed to soften the hull and then passed through degerminators which separate the hull and germ from the endosperm. The large white hominy grits constituting the endosperm are mixed with a flavoring material of malt extract, sugar and salt and cooked under steam pressure in rotary cookers.

The cooked grits are dried by hot air and then flaked between revolving rolls. The flakes are toasted in rotary ovens. The toasted flakes are conveyed on belts to the packing rooms and packed in sealed waxed-paper inserts in paper cartons.

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture	2.8
Ash (including salt)	2.7
Fat (ether extract)	0.3
Protein (N × 6.25)	7.5
Crude fiber	0.4
Carbohydrates (by difference) other than crude fiber	86.3

Calories.—3.78 per gram; 107.4 per ounce.

Claims of Manufacturer.—A good quality corn flakes. They are easily digested and supply the body with heat and energy.

SWAN'S SLICED BREAD

Manufacturer.—Swan Brothers, Inc., Knoxville, Tenn.

Description.—A white bread made by the sponge dough method.

Manufacture.—The sponge dough ingredients, 80 per cent patent flour of Southwest wheat, water, lard, yeast, and a yeast food containing calcium sulphate, ammonium chloride, sodium chloride and potassium bromate, are mixed in a high speed mixer. The sponge dough is fermented for from four to six hours, after which are added flour, water, salt, sucrose, lard and powdered skim milk to make the completed dough, which is cut into pieces of desired weight. The pieces are fermented for a short time, molded into loaf form, panned, further fermented, baked for from thirty to thirty-five minutes, cooled, and wrapped in wax-paper.

The factory, equipment and storage rooms for the materials used are kept in strictly sanitary condition.

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture (entire loaf)	37.0
Ash	1.6
Fat (ether extract)	2.8
Protein (N × 6.25)	9.2
Crude fiber	0.4
Carbohydrates (by difference) other than crude fiber	49.0

Calories.—2.58 per gram; 73.3 per ounce.

Claims of Manufacturer.—A bread of good quality.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 NORTH DEARBORN STREET - - - CHICAGO, ILL.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - Seven dollars per annum in advance

Please send in promptly notice of change of address, giving both old and new; always state whether the change is temporary or permanent. Such notice should mention all journals received from this office. Important information regarding contributions will be found on second advertising page following reading matter.

SATURDAY, OCTOBER 24, 1931

THE PHYSICIAN AS WRITER, LECTURER AND PUBLICIST

The Principles of Ethics of the American Medical Association emphasize the duty of the physician to aid in educating the public properly regarding the facts of medicine. Thus the medical profession secures public cooperation in the prevention of epidemics and in the control of disease. The manner in which public education shall be carried on has been the subject of acrimonious discussion at various times, probably, no doubt, because customs vary in different communities and because of the lack of any written code providing a detailed consideration of the subject.

The problem has concerned our British colleagues, who set forth in the Handbook of the British Medical Association some basic principles. Thus the principle has been established that medical practitioners should not give lectures gratuitously under the egis of local authorities, and that, although the lecturer must in every case necessarily be approved by the local authorities, there is no reason why any particular class of practitioner should be excluded from delivering such lectures. The British association has urged on its divisions and branches that they should lose no time or opportunity of getting local authorities to take action for the better education of the public in health matters. Lectures for the public have been established in relationship with the annual sessions, and publicity is regularly given to these means of education. On the other hand, our British colleagues have condemned unreservedly prescribing in the lay press in answer to questions.

Considerable clarity is brought into the situation by the recent adoption, through the Comitia Minora of the Medical Society of the County of New York and the council of the New York Academy of Medicine, of a series of principles governing contact of physicians with the public through the press, the lecture platform, lay periodicals and the radio. The necessity for proper publicity and education is recognized in the preamble. Moreover, legitimate news of the election of officers, opening of hospitals and awarding of prizes is recognized as desirable, and the use of a physician's name in this connection is not considered reprehensible. The committee does condemn exploitation or advertisement of individuals featuring their comings and goings, their connections and their achievements and honors—in other words, the kind of publicity most sought by the group characterized by experienced newspaper men as "publicity hounds."

The New York group recognizes, moreover, the desirability of propaganda for the public health, particularly as relates to the prevention of tuberculosis and cancer and the control of diphtheria, and the necessity, because of current press customs, of the use of the names of physicians in connection with such propaganda. This applies equally to authoritative statements on public health made by men who are of established reputation in the fields on which they speak.

In a special section devoted to the radio, the New York group recognizes the necessity of introducing the speaker by name and the desirability of establishing his status through the mention of some official connection which he may have to a university or to a medical organization. At the same time, the bad taste involved in unduly dwelling on the person of the speaker and his unique and outstanding practices is emphasized. It is realized that such addresses are best made under the auspices of established medical organizations. The relationship of educational broadcasting to commercial considerations, particularly since radio in this country is so largely under the control of commercial firms, is provided for in the following paragraphs:

> Commercial organizations may purchase time "on the air" with increasing frequency in order to procure good will, and use it for broadcasting public health information. Frequently, physicians are employed to compose and deliver such broadcasts.
>
> Provided that the commercial organization is of reputable standing, there is no objection to physicians accepting such employment. A physician must not, however, make his address an endorsement or testimonial for the product or products of the organization on whose time the broadcast is given.
>
> In order to safeguard himself and the profession, when such employment is offered him, a physician should confer with the Medical Information Bureau, both as to the standing of the commercial organization with which he is to make a connection and the contents of the paper or papers he proposes to broadcast.
>
> It is also important that the announcer's continuity should be acceptable. No exaggerated or unwarranted claims should be allowed nor should the announcer be permitted to imply that the speaker endorses the commercial organization or its products.

In order to protect physicians who write for magazines and periodicals against undue criticism, the principles provide for a survey of such contributions by the local medical organization. Indeed, as is made clear in the summary, the whole purpose of these principles is to protect the public primarily and to encourage the expression of the views of the profession to the public.

The following regulations have been adopted by both organizations with the understanding that failure to

comply will make the offender liable to disciplinary measures by the Medical Society of the County of New York, the Academy of Medicine, or both:

1. A physician shall not directly or indirectly seek publicity for himself tending to call attention to his professional attainments or activities.
2. A physician shall not issue testimonials or endorsements calculated to promote the sale to the lay public of any product in any way related to health or the prevention and cure of disease.
3. A physician shall not issue or authorize for publication his photograph in connection with any matter affecting his or her professional relationship with the public.
4. When reading a paper over the radio, neither the announcer nor the physician should give more than one of his titles nor give notice of his own medical experiences or accomplishments.

Our New York colleagues have here taken an advanced and noteworthy step in establishing the relationships of modern medicine to the public. It is conceivable that experience, the changing of customs and the passing of time may make necessary some modifications in these principles. Nevertheless, their codification provides a basis for study and will do much to establish proper medical education more widely. Those who have looked askance at all such efforts may view with fear and trembling this legalization of medical publicity; those who have taken part in the progress in this field, already made by many county and state medical societies, will see in this code an attempt to bring order into a situation where chaos has been an obstruction.

IS VITAMIN A AN ANTI-INFECTIVE AGENT?

The significance of vitamin A as an essential of human nutrition can no longer be questioned. The demonstration of the occurrence of xerophthalmia as a dietary deficiency disorder has been firmly established. With the growth of our knowledge of vitamins and with the increasing enthusiasm for a better understanding of their rôle in the diet, reports of the effects of defective nutrition are being accumulated in growing numbers. The dramatic accounts of blindness resulting from unsuitable diet, such as Bloch[1] of Copenhagen has repeatedly described, can now be duplicated from records in many parts of the world. They may be anticipated to recur in times of stress such as threaten to face many persons in the coming months unless conditions are materially improved. The phenomena induced in the laboratory in deficiency studies on experimental animals are as a rule quite drastic; they represent the outcome of rather severe conditions of extreme deprivation of some food essential. Accordingly, one hears that the observations of the experimenter should not be translated into terms of human experience. Nevertheless, growing experience is showing that the differences are merely those of degree. The maladies due to partial starvation or deprivation of food essentials are usually slower in manifesting themselves; and the symptoms may be somewhat more elusive for a time. But deficiencies leave their mark sooner or later.

Until recently, physiologists have been engrossed with the consideration of the more obvious manifestations of deficiency disorders. The gross lesions of scurvy, pellagra, rickets and other results of dietary defects have received foremost consideration. It was inevitable, however, that less obvious features would sooner or later demand attention. When mastoid and nasal sinusitis, purulent otitis media, and ocular, respiratory and alimentary tract infections were found to occur in laboratory animals deprived of vitamin A, the problem of "lowered resistance" naturally presented itself. Are we to look on vitamin A specifically as concerned in the development of immunity in the body? The early investigations directed toward the answer to this query were concerned with the status of various sorts of "immune substances" in relation to the diet. The results were frankly disappointing. There was no evidence of a diminished efficiency of the general humoral defenses of the body in vitamin A deficiency. For example, there is no loss in agglutinating power of the blood against various micro-organisms. The observations of Wolbach and Howe at Harvard University gave a better insight into the pathology of vitamin A deficiency. They found that the principal changes were transformations of various epitheliums into a stratified keratinizing epithelium of the squamous type in many parts of the body. This suggests that infection may follow the weakening of the tissues, and it may be due to the breakdown of the local tissue defenses.

These considerations have raised the question as to whether it is proper to refer to vitamin A as an "anti-infective" agent. New light has been thrown on the problem by the recent studies of Boynton and Bradford[2] at the University of Rochester, N. Y. Young white rats were inoculated by intraperitoneal injection of a standard suspension of virulent bacteria after four, six, eight and ten weeks on a vitamin A-free diet. Markedly decreased resistance to such infection, compared with controls receiving cod liver oil, was demonstrated before other signs of vitamin A deficiency appeared. No such susceptibility to similar inoculations was found in young rats on a diet deficient in vitamin D, compared to controls protected by viosterol. The Rochester investigators remark that, whereas from six to eight weeks on the vitamin A-free diet was required to deplete the body stores of vitamin A to such an extent as to result in cessation of growth, marked susceptibility to infection was evident as early as the fourth week on the deficient diet. Increased susceptibility to infection is apparently an early manifestation of a dietary low in vitamin A, having marked

1. Bloch, C. E.: Effects of Deficiency in Vitamins in Infancy, Am. J. Dis. Child. 42: 263 (Aug.) 1931.

2. Boynton, L. C., and Bradford, W. L.: Effect of Vitamins A and D on Resistance to Infection, J. Nutrition 4: 323 (Sept.) 1931.

influence before the physical signs of deficiency are present. The animals in the group inoculated at four weeks were seemingly healthy, active specimens, maintaining a rate of growth not greatly below the controls receiving cod liver oil. This point, Boynton and Bradford add, is of especial clinical significance since classic signs of vitamin A deficiency, such as xerophthalmia, are rarely seen in this country; yet it is quite probable that relative degrees of vitamin A deficiency exist, predisposing the individual to various types of infection.

There has been a lack of cogent evidence that vitamin A can cure infections when the barrier of the mucous membranes has been passed or that it can prevent or cure infections that enter the blood stream. That is why Cramer [3] and others have opposed the use of the expression "anti-infective vitamin." The newer studies pave the way for the possibility, however, that vitamin A may after all do more than maintain the physiologic defenses of the mucous membranes.

SAFE PRODUCTS FOR PARENTERAL ADMINISTRATION

Evidence is gradually accumulating to indicate that dietary essentials which are present in presumably adequate amounts in the food may nevertheless escape proper utilization in the body, so that nutritional failure may ensue. There have been instances of threatened xerophthalmia, for example, which have not been cured by feeding cod liver oil or other sources of vitamin A, because of alimentary conditions that interfered with the absorption of the essential food factor. Relief was brought about by parenteral administration of products bearing vitamin A. Something analogous to this was referred to at the Philadelphia session of the American Medical Association in relation to the liver treatment of pernicious anemia. Castle and his associates [4] of the Harvard University Medical School reported a significant study of two patients, one of whom was relatively unaffected by the daily ingestion of the extract prepared from 300 Gm. of liver and the other by extract derived from 600 Gm. of liver given daily. Both responded normally to a single intravenous injection of extract derived from 100 Gm. of liver. The hematopoietic substance can evidently be utilized directly, without intervention of the digestive functions. The same ready parenteral utilization has been demonstrated for a variety of vitamin preparations involving vitamins A, B, C and D, and likewise the A-precursor, carotene. These facts are of great importance for cases in which, for one reason or another, the oral path of administration is excluded or ineffective. This may happen as the result of obstructions or of serious disturbances of the alimentary mucosa. There is one feature of such medication that needs special and serious consideration.

Liver preparations and products in general derived from cellular material are likely to contain traces at least of protein. Parenteral use of such material at once raises the possibility of allergic reactions with a series of untoward symptoms in their wake. It becomes a desideratum to have protein-free, nonallergic hormone and vitamin products available for injection. This is doubly true if the intravenous or other parenteral use of such products shall prove to be more economical and satisfactory, if not actually necessary in every instance. Allergic problems such as are involved in the use of therapeutic immune serums must be averted. It is gratifying to know that the biochemists are making progress in rendering safe products available. Pernicious anemia has been described as a "conditioned deficiency disorder" due to a failure of some digestive process of the normal stomach to take place in the stomach of the subject with pernicious anemia.

McLester [5] has suggested that a gastric defect such as has been postulated for pernicious anemia with its achylia gastrica may apply similarly to pellagra. It might prevent the pellagrin from properly elaborating from his food the essential substance. Substitution therapy calls for these products in a form in which they are not likely to harm the patient while they are curing the deficiency disorder.

Current Comment

THE ABSORPTION OF LEVULOSE

Not many years ago levulose, or fruit sugar, was a comparatively rare substance represented for the most part by specimens in chemical laboratories. It was not readily secured in a state of high purity or crystalline form. On these accounts this sugar attracted little interest except in the occasional experiments of physiologists and clinicians. More recently, however, owing to improved processes of production, levulose has become more easily available at lower costs. This has tended to awaken new interest in its dietary use and therapeutic possibilities. Levulose is exceptionally sweet—a feature of obvious interest. It is readily utilized in the body, forming a glycogen that is indistinguishable from the storage carbohydrate that results from dextrose. Various investigators have asserted, from time to time, that levulose is particularly valuable in the dietary of patients with diabetes. Perhaps the most enthusiastic report, among the conflicting statements, is to be found in the summary by Joslin.[6] He is inclined to believe that levulose can be used with advantage in the diabetic diet in small amounts daily for intermittent periods. It will raise the respiratory quotient in a diabetic patient more than dextrose and

3. Cramer, W.: Vitamin A and Infections, Lancet **1**: 1153 (May 24) 1930.

4. Castle, W. B.; Heath, C. W.; Strauss, M. B., and Townsend, W. C.: The Relationship of Disorders of the Digestive Tract to Anemia, J. A. M. A. **97**: 904 (Sept. 26) 1931.

5. McLester, J. S., in discussion on the relationship of disorders of the digestive tract to anemia, J. A. M. A. **97**: 906 (Sept. 26) 1931.

6. Joslin, E. P.: The Treatment of Diabetes Mellitus, ed. 4, Philadelphia, Lea and Febiger, 1928.

the heat production as well. Levulose seems to cause a different type of metabolism from dextrose, possibly because of the conversion of levulose in part into fat in diabetes or to a more active stimulation of the production of insulin. The possibility that levulose can be converted to dextrose in the process of absorption from the small intestine has been experimentally tested by Burget and Moore [7] at the University of Oregon Medical School. This transformation certainly does not take place within the lumen of the intestine, or in the mucosa during absorption. When levulose is introduced into the bowel, the mesenteric blood shows the presence of the unchanged sugar, whereas it can no longer be detected in the systemic blood. Whatever transformations occur take place beyond the seat of absorption.

SERUM SICKNESS IN RABBITS

Extensive studies of the physiology and pharmacodynamics of anaphylactic shock have been made in lower animals, but comparatively few studies of the clinically more important serum sickness. This has been due, in large measure at least, to the lack of a reliable clinical index of serum sickness in laboratory animals. The currently described "serum sickness reaction" in rabbits will therefore probably stimulate experimental interest in this subject. Fleisher and Jones [8] of the St. Louis University School of Medicine injected normal rabbits intravenously, intramuscularly and subcutaneously with from 3 to 10 cc. of horse serum per kilogram of body weight. They noted in 66 per cent of the injected rabbits a characteristic erythema and accompanying edema of the basal third of the ear, the lesion occasionally extending upward to involve the lower two thirds. The reaction usually appeared about the fifth to sixth day after the serum injection. No marked differences have thus far been noted in the severity or time of appearance of this lesion with normal horse serum and commercial antiserums. A few specifically hypersensitive rabbits have been studied, with a resulting shortening of the latent period, the characteristic basal edema and erythema at times appearing within a few hours.

Association News

MEDICAL BROADCAST FOR THE WEEK

American Medical Association Health Talks

The American Medical Association broadcasts at 9:15 a. m. on Monday, and 10:30 a. m. on Saturday, over Station WBBM (770 kilocyles, or 389.4 meters).

The program for the week is as follows:

October 26. How to Liver Longer.
October 31. The Prevention of Diphtheria.

Five minute health talks may be heard over the Columbia Broadcasting System on Monday and Saturday from 12 noon to 12:05 p. m., Central Standard Time.

The program for the week is as follows:

October 26. Everybody's Business.
October 31. Dandruff, Dandruff, Everywhere.

7. Burget, G. E., and Moore, P. H.: Is Levulose Converted to Dextrose in the Process of Absorption from the Small Intestine? Proc. Soc. Exper. Biol. & Med. **28**: 810 (May) 1931.

8. Fleisher, M. S., and Jones, L.: Serum Sickness in Rabbits, Proc. Soc. Exper. Biol. & Med. **28**: 881 (June) 1931.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

CALIFORNIA

Society News.—Dr. Russell L. Haden, Cleveland, addressed the Alameda County Medical Association, October 8, on "Clinical Significance of Volume Index Determinations in Anemia."——Dr. Benjamin Y. Katz, among others, spoke on "Treatment of Papillomata of the Larynx: Observations with Calcined Magnesia" before the Los Angeles Society of Ophthalmology, October 12.——The Los Angeles Society of Neurology and Psychiatry was addressed, October 21, by Drs. Edward H. Williams and Mark A. Glaser on "Recent Advances in the Treatment of Psychoses" and "Value of Encephalography in the Diagnosis of Brain Lesions," respectively.——Drs. Edward S. Blaine and John W. Nevius will address the Trudeau Society, Los Angeles, October 27, on "X-Ray Visualization of the Small Pneumothorax and Its Diagnostic Significance" and "Bilateral Pneumothorax," respectively.——The San Francisco Pathological Society was addressed, October 12, by Drs. Isabella H. Perry on "Cysticercus Cyst of the Brain"; Alfred H. Heald, "Tumor of the Heart"; Harry M. Blackfield, "Sarcoma of the Stomach"; Leonard W. Buck, "Splenic Implants," and Adelbert M. Moody, "Chloroma of the Uterus."

CONNECTICUT

Dr. Peppard Appointed Director of Mental Hygiene.—The appointment of Dr. Stanley Harcourt Peppard, formerly of New York, as the director of the bureau of mental hygiene of the state department of health was recently announced by Dr. Stanley H. Osborn, state health commissioner. Dr. Peppard, who assumed the position, September 14, succeeds Dr. James L. McCartney, resigned. He graduated from Dalhousie University, Halifax, N. S., in 1923 and was formerly connected with the New York School for Feeble-Minded at Letchworth Village.

GEORGIA

Dr. Campbell Honored.—A complimentary dinner was given to Dr. James L. Campbell, professor of clinical surgery, Medical School of Emory University, October 5, on the occasion of his retirement from the active staff of Grady Hospital after a service of forty years. Mr. Samuel C. Dobbs, chairman of the board of trustees of the hospital, acted as toastmaster. Dr. Weldon E. Person, Atlanta, presented a silver loving cup to Dr. Campbell on behalf of the medical school faculty. Dr. Campbell will continue as a consultant to the hospital and will remain a member of the faculty of the university. He is a past president of the Fulton County Medical Society. Among the speakers on this occasion were Drs. Charles E. Waits, Daniel C. Elkin, Cyrus W. Strickler, George F. Eubanks, Jr., F. Phinizy Calhoun, and Thomas C. Davison, all of whom were students of Dr. Campbell. Dr. Russell H. Oppenheimer, dean of the medical school, also spoke.

ILLINOIS

Personal.—Dr. Charles F. Harmon, Springfield, has been appointed chief of the division of social hygiene in the state department of public health, succeeding Dr. Ira Chester C. Copelan, who held the position about eleven years. Dr. Harmon's appointment became effective, October 1.

Typhoid Outbreak.—Eighteen cases of typhoid were recently reported to the state department of health, twelve of the cases occurring in two families. Eight members of one family were ill with the disease in Quincy and nine patients in Ridgway, four of whom were in one family, it is reported. The infection in Quincy was said to have been due to drinking polluted well water.

Milk-Borne Epidemic.—An outbreak of scarlet fever, involving at least nine cases, occurred in Alton and vicinity during the first two weeks of September. A raw milk supply from a local dairy was held responsible for the outbreak in Alton. The dairy was immediately closed. It was the first milk-borne epidemic in the state since October, 1929, when there was a milk-borne outbreak of typhoid in Carbondale.

Society News.—Dr. Evarts A. Graham, St. Louis, addressed the St. Clair County Medical Society, October 1, on "Lowering the Mortality After Operations on the Biliary Tract."——At

a meeting sponsored by the Logan County Medical Society, September 24, more than 200 physicians of Central Illinois were addressed, among others, by Dr. Budd Clarke Corbus, Chicago, on "Newer Ideas in Immunology," and Dr. Harry Mortimer Richter, Chicago, "Gastric and Duodenal Ulcers," illustrated.——Dr. Arthur E. Hertzler, Kansas City, Mo., addressed the Vermilion County Medical Society, October 6, on goiter.——Dr. Gilbert H. Marquardt, Chicago, addressed a joint meeting of the Tri-County Medical Society and the Warren County Medical Society, October 15, on "Vascular Pains and Vascular Edema of the Legs—Their Diagnosis and Treatment"; Dr. Lowell D. Snorf, Chicago, spoke on "Treatment of Peptic Ulcer and Its Complications." Dr. Harold O. Jones, Chicago, presented a moving picture with sound on gynecology.——Dr. Ralph A. Kinsella, St. Louis, addressed the Adams County Medical Society, October 12, on "Treatment of Streptococcal Infections."——Dr. John de Jarnette Pemberton, Rochester, Minn., addressed the Sangamon County Medical Society, October 1, on "Problems in Surgery of the Thyroid Gland."

Chicago

Dr. Wilder Goes to Mayo Foundation.—Dr. Russell M. Wilder recently resigned as professor of medicine at the University of Chicago to join the staff of the Mayo Clinic and the faculty of the Mayo Foundation Graduate School of the University of Minnesota in a similar capacity. Dr. Wilder was formerly connected with the Mayo Foundation. He has been at the University of Chicago since 1929.

Dr. Carlson to Give Belfield Lecture.—The third annual William T. Belfield Lecture of the Chicago Urological Society will be delivered, October 29, by Dr. Anton J. Carlson, professor of physiology, University of Chicago, in the auditorium of the Medical and Dental Arts Building. His subject will be "Rejuvenation." Carl R. Moore, Ph.D., and Fred Conrad Koch, Ph.D., will open the discussion.

Society News.—Dr. William Bloom addressed a joint meeting of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine, October 23, on "Recent Studies on the Origin and Interrelationships of the Blood Cells."——Harry S. Sobotka, chief chemist to the Mount Sinai Hospital, New York, spoke on "Biochemistry of Bile Acids and Its Bearing on Physiological and Pathological Problems," October 13, at the Michael Reese Hospital.——The Chicago Neurological Society was addressed, October 22, by Dr. Joseph A. Luhan, among others, on "Some Postural Reflexes in Man."

INDIANA

Sanitation Program in Drought Area.—Under an appropriation made by the federal government for meeting health needs in the drought area, the U. S. Public Health Service and the state board of health are cooperating with local officials and health agencies in a number of counties in the drought area of the state. Cooperative budgets for public health work have been approved in Crawford, Harrison, Jefferson, Jennings, Martin, Morgan, Orange, Owen, Perry, Posey, Spencer and Sullivan counties. Immunization programs against diphtheria, typhoid and smallpox are being carried out in all these counties. A program of rural sanitation was inaugurated, September 1.

Society News.—The forty-sixth semiannual meeting of the Eleventh Indiana Councilor District Medical Association was addressed, October 15, by Drs. Andrew B. Rivers, Rochester, Minn., on "Cause of Hematemesis"; Louis H. Segar, Indianapolis, "Recent Advances in Pediatrics," and Lester B. Rhamy, Wabash, "Present Status of Treatment of Hay Fever."——The joint meeting of the Indianapolis Medical Society and the Seventh District Medical Society, Franklin, will be addressed, October 27, among others, by Dr. Irvin Abell, Louisville, on "Primary Multiple Malignant Growths."——Dr. Willis D. Gatch, Indianapolis, addressed the Elkhart County Medical Society, October 1, on "Diagnosis and Treatment of Intestinal Obstruction."

Five-Year Oral Hygiene Program.—The Indiana State Dental Association, at a recent conference of dentists, physicians and others, presented and discussed a five-year oral hygiene program which is to be carried out in cooperation with the state board of health through schools of the state. The following objectives of the program were listed: (1) a comprehensive educational program for educators, parents, teachers and students; (2) dental examination in all grades in the public schools coordinated with a systematic follow-up of such examination, and (3) instruction of all school pupils in the means of building and maintaining sound teeth. It was said that the association will endeavor to have established in the state board of health a division or department of dental hygiene with a qualified dentist as director; to secure the appointment of a competent dentist on the staff of every hospital; to have scientific information on how to build and maintain sound teeth included in textbooks; to have dental health work included in teacher training; to organize district and state oral hygiene conferences, and to develop leadership for a dental health program in each county of the state.

KENTUCKY

Personal.—Dr. Joseph W. Davis, Lexington, health director of Fayette County, has resigned to accept a similar position in Parkersburg, W. Va.——Dr. George M. Wells, formerly health officer of Trigg County, has been appointed director of the newly established health unit in Warren County.

Society News.—Dr. James E. Winter addressed the Jefferson County Medical Society, Louisville, October 5, on "Effect of Disease on Calcium and Magnesium Content in the Blood." A symposium on intravascular complications in surgery was presented at the meeting, October 19, with Drs. Joseph Garland Sherrill, Walter I. Hume and Louis Frank, all of Louisville, as the speakers.——Dr. Charles L. Seitz, Evansville, Ind., among others, addressed the Christian County Medical Society, Hopkinsville, September 22, on "Diagnosis and Treatment of Cancer of the Uterus."——Three Louisville physicians provided the program of the Harlan County Medical Society, September 26, as follows: Drs. Louis Wallace Frank, who spoke on acute conditions in the abdomen; Samuel A. Overstreet, roentgen diagnosis of gastro-intestinal lesions, and James R. Stites, cystoscopic treatment of urinary calculi.——Dr. Clement C. Fihe, Cincinnati, addressed the Licking Valley Medical Society, Flemingsburg, September 24, on diseases of the alimentary canal.

MARYLAND

Personal.—Dr. William D. Tillson has been appointed assistant health officer of Baltimore County. He was formerly connected with the Ohio State Department of Health as chief of the tuberculosis bureau.

Mayor Appoints Physicians.—The following physicians have been appointed by the mayor for the treatment of injured Baltimore city employees on a fee basis:

For the bureau of water supply: Drs. Frank S. Hundley, Karl J. Steinmueller and Frederick H. Vinup.
For the bureau of highways: Drs. Herbert C. Blake, Leonard A. Richardson and Walter W. White, Jr.
For the bureau of sewers: Drs. Harry J. Tankin, Maxwell L. Mazer and William Wallace Walker.
For the mechanical-electrical bureau: Drs. Charles F. Coughlin and Anton G. Rytina.
All other bureaus in the department of public works: Drs. Herman A. Voigt, Joseph Pokorny, William S. Smith and Anthony V. Buchness.

Society News.—The Baltimore City Medical Society was addressed, October 23, by Wilbur W. Swingle, Ph.D., and J. J. Pfiffner of Princeton University, Princeton, N. J., on "Studies on the Adrenal Cortical Hormone," and Drs. George A. Harrop, Jr., Albert Weinstein and Arthur A. Marlow, "Treatment of Addison's Disease with Adrenal Cortical Hormone." The society's meeting, October 9, was house officers' night.——Raymond A. Pearson, LL.D., president of the University of Maryland, Baltimore, among others, spoke before the Southern Maryland Medical Association, August 26, on the relationship the medical school should bear to the medical profession.——Dr. Harry M. Stein, Baltimore, addressed the Cumberland Valley Medical Society, September 24, on diabetes.——The semiannual meeting of the Medical and Chirurgical Faculty of Maryland was held, October 21, at the West Nottingham Academy in Cecil County; the scientific session was addressed by Drs. Charles Reid Edwards on "Conditioned Air, Some of the Indications for Its Use in Surgical Cases"; Emil R. Mayerberg, Wilmington, Del., "Otologic Observations of Importance to the General Practitioner," and William H. Welch, Baltimore, "Distinguished Physicians Who Have Graduated from West Nottingham Academy."

MASSACHUSETTS

Lectures at Harvard University.—Dr. John M. Birnie, Springfield, will deliver the George W. Gay Lectures on "Medical Ethics" at the Harvard University Medical School. Wednesday, November 4, Dr. Birnie's subject will be "Ethics for the Doctor," and Wednesday, November 18, "Independence for the Doctor." Dr. Gerald B. Webb, Colorado Springs, Colo., gave one of the lectures on "The Care of the Patient" at the medical school, October 21. The title of his address was "The Prescription of Literature." Dr. Stewart R. Roberts, Atlanta, Ga., will give the second lecture of the series, October 28, on "The Art and Human Nature."

Society News. — Dr. John Lovett Morse, Boston, will address the Massachusetts Dietetic Association, January 12, on "Food for the Infant and Young Child." The association will be addressed, March 8, by Dr. Reginald Fitz, Boston, on "The Changing Problem of Dietetics," and, April 12, by Dr. Herrmann L. Blumgart, Boston, on "Importance of Diet in the Treatment of Patients with Cardiovascular Disease."——A joint meeting of the Greater Boston Medical Society and the Beth Israel Hospital was addressed, October 6, by Drs. Abraham Myerson on "Intracranial Dynamics" and Sidney D. Kramer, "Present Status of Poliomyelitis."——Dr. Halbert G. Stetson, Greenfield, addressed a joint meeting of the Essex North, Middlesex North, East and Essex South district medical societies, October 14, on "What Your State Society Is Planning and Doing," and Dr. Clarence A. Bonner, Danvers, spoke on "Rôle of Psychiatry in the Practice of Medicine."

Dr. Cannon Honored. — Dr. Walter Bradford Cannon, George Higginson professor of physiology at Harvard University Medical School since 1906, was honored at a testimonial meeting, October 15, in celebration of his twenty-five years in that position. Dr. David L. Edsall, dean of the medical school, presided over an afternoon program at which Dr. Walter C. Alvarez, Rochester, Minn., spoke on "Influence of Dr. Cannon's Work upon Medical Thought and Progress," and Dr. William H. Howell of the Johns Hopkins School of Hygiene, Baltimore, "Development of Physiology During the Past Twenty-Five Years and Dr. Cannon's Influence upon It." President Abbott L. Lowell presided at a dinner in the evening when Dr. Graham Lusk, professor of physiology, Cornell University Medical School, New York, spoke on "The Life of a Professor." At this time a portrait of Dr. Cannon, from a photograph of which the accompanying illustration was made, was presented to the medical school. The committee in charge of the celebration consisted of Dr. Henry A. Christian, chairman, Dr. Harvey Cushing, Dr. Alexander Forbes, Alfred C. Redfield, Ph.D., and Dr. Cecil K. Drinker. Dr. Cannon graduated at Harvard University Medical School in 1900. He is a member of numerous scientific societies and his works include "A Laboratory Course in Physiology," "The Mechanical Factors of Digestion," and "Traumatic Shock." Dr. Cannon received the Distinguished Service Medal during the World War.

MISSISSIPPI

Forger Impersonates Physician. — Dr. James Milton Acker, Aberdeen, has reported that a man has been cashing checks in his name in several towns in Alabama and Florida. All checks have been drawn on the Monroe Banking and Trust Company of Aberdeen, for either $10 or $15. The first check reported to Dr. Acker was given to a drug firm in Tuscaloosa, Ala., which described the forger as about 50 years old, slightly gray and weighing about 170 pounds.

Society News. — The Issaquena-Sharkey-Warren Counties Medical Society was addressed, September 8, by Drs. John E. Quidor, on "Malaria Prevention"; Edley H. Jones, "Scope of Allergy"; William G. Weston, "Use of Diuretic Drugs in the Treatment of Advanced Cardiac Failures," and Nathan B. Lewis, Vicksburg, "Mucous Colitis." The society was addressed, October 13, among others, by Dr. John A. K. Birchett, Jr., Vicksburg, on "Meckel's Diverticulum—Its Significance and Complications." —— The Eighth Councilor District Medical Society was addressed in Natchez, October 6, among others, by Drs. Philip L. Mull, University, on "Medical Education in Mississippi"; Isidore Cohn, New Orleans, "Surgical Significance of Splenomegaly," and Thomas B. Sellers, New Orleans, "Constitutional Symptoms of Gynecological Origin and Treatment of Causative Conditions."——Dr. Jacques H. Baumhauer, Mobile, Ala., addressed the Jackson County Medical Society, September 7, on "Food Allergy in Children."——The Central Medical Society was addressed, September 15, by Drs. Marvin Brister Ware, New Orleans, on "Surgery in Diabetes"; Levi B. McCarty, "Complications of Malaria"; Thomas E. Wilson, Jr., Jackson, "Angina Pectoris," and Oscar G. Eubanks, Crystal Springs, "Handling of Cardiac Cases in Private Practice."—— The Northeast Mississippi Thirteen County Medical Society was addressed at Columbus, September 15, among others, by Dr. De Witt Hamrick, Corinth, on "Function of the Faucial Tonsil," and Dr. Samuel P. Wainwright, Birmingham, "Tuberculosis of Infancy and Childhood with Reference to Early Diagnosis and Tuberculin Reaction."——Dr. Kutcher T. Klein, among others, addressed the East Mississippi Medical Society at Meridian, October 8, on barbital preparations, particularly sodium amytal.

MONTANA

State Campaign Against Cancer.—Dr. John H. Garberson, Miles City, president of the Montana State Medical Society, recently appointed a committee of fifteen members for the purpose of formulating plans for an active campaign against cancer in the state. Dr. Louis H. Fligman, Helena, state director for the American Society for the Control of Cancer, has been appointed chairman of the committee. Other members are Drs. Ernest D. Hitchcock, Great Falls; Wyman W. Andrus, Miles City; John A. Evert, Glendive; Charles C. Wallin, Lewistown; Fayette B. Ross, Kalispell; William W. Taylor, Whitefish; James F. Blair, Bozeman; Duncan S. MacKenzie, Havre; Thomas L. Hawkins, Helena; John P. Ritchey, Missoula; Byron L. Pampel, Livingston; George McGrath, Hamilton; Herbert D. Kistler, Butte; Mark D. Hoyt, Glasgow, and Charles F. Watkins, Billings.

NEW JERSEY

Health at Trenton. — Telegraphic reports to the U. S. Department of Commerce from eighty-two cities with a total population of 36 million, for the week ended October 10, indicate that the highest mortality rate (18.1) appears for Trenton and the rate for the group of cities as a whole, 10.3. The death rate for Trenton for the corresponding period last year was 20.7 and for the group of cities, 10.9. The annual rate for eighty-two cities was 12 for the forty-one weeks of 1931 and the same rate appears for the corresponding weeks of 1930. Caution should be used in the interpretation of weekly figures, as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or that they have a large Negro population may tend to increase the death rate.

NEW YORK

Society News.—Drs. James N. Vander Veer and Albert Pfeiffer, Albany, addressed the Medical Society of the County of Rockland at Letchworth Village, Thiells, September 23, on treatment of venereal disease, and Dr. George W. Henry, White Plains, "Practical Application of Psychiatry to General Medical Practice."——Drs. Robert A. Cooke and William L. Sneed, New York, addressed the Medical Society of the County of Nassau, September 29, on "Diagnosis and Management of Allergic Conditions" and "After-Care of Poliomyelitis," respectively.——The western district health office has moved into new quarters in the State Office Building, Niagara Square, Buffalo. Dr. Archibald S. Dean is health officer of the district, which comprises Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans and Wyoming counties.

New York City

Diploma and Licenses Lost.—Dr. John C. Kindred has reported that his diploma from the Medical College of Virginia, his license to practice in New York and his certificate of registration in Queens County have been lost. The three certificates were taken to a New York department store for framing and after an interval the store notified Dr. Kindred they had been lost.

Awards for Orthopedic Research. — The Hospital for Joint Diseases announces that the Henry W. Frauenthal Travel Scholarship has been awarded to Dr. Sidney A. Bernstein and the two Brown Orthopedic Research Fellowships have been awarded to Drs. Ernst Freund, Vienna, Austria, and Sheldon A. Jacobson. Each of the awards amounts to $2,400 a year. Dr. Bernstein will spend six months in American clinics and six months in Europe, while Dr. Freund and Dr. Jacobson will engage in clinical and laboratory research at the Hospital for Joint Diseases.

Guide to Welfare Agencies.—The Welfare Council has issued a leaflet containing information on the welfare agencies of New York for the guidance of persons to whom the unfortunate appeal for assistance. The principal family welfare

organizations for each borough are listed with telephone numbers and information as to their special fields. The guide also lists twenty specialized information bureaus equipped to put inquirers in touch with particular fields of service, as care for the aged, care for children, help for the handicapped, general and specialized health information, recreation and legal aid.

Hospital News.—Nonmunicipal hospitals in New York will face a deficit of $12,000,000 by January 1, the United Hospital Fund recently announced. This will be $3,000,000 more than the deficit for 1930. A petition for $1,500,000 from the city budget for private hospitals caring for city patients is now before the board of estimate, it was said.——Dr. I. Snapper of the University of Amsterdam delivered an address on "Practical Value and Theoretical Explanation of Erythrocyte Sedimentation," at Mount Sinai Hospital, October 9.——The new six-story dispensary of St. Vincent's Hospital was dedicated, October 5.

PENNSYLVANIA

Joint Society Meeting.—The fifteenth annual joint meeting of the Lehigh, Northampton and Bucks county medical societies and the Lehigh Valley Homeopathic Medical Society was held, October 13, at the Allentown State Hospital. A symposium on psychoneurosis was held, after an inspection trip through the hospital, with the following physicians as the participants: Drs. Harry F. Hoffman, Max Rossman, Lucy Etta B. Vaughn, Edgar M. Blew and Henry I. Klopp.

Graduate Lectures.—The Easton Hospital began its second annual series of graduate lectures, offered to physicians of Northampton and surrounding counties, October 21, with the following speakers: Drs. Ralph M. Tyson, Philadelphia, on "The New-Born Child"; William W. G. Maclachlan, Pittsburgh, "Observations on Pneumonia"; Harold L. Foss, Danville, "Goiter and Its Surgical Treatment," and Howard R. Hartman, Rochester, Minn., "Gastric Lesions and Gastric Hemorrhage."

Society News.—Dr. John J. Moorhead, New York, addressed the Westmoreland County Medical Society, Greensburg, October 13, on "The Practice of Traumatic Surgery."——Mr. Lester H. Perry, Pittsburgh, has been appointed executive secretary of the Allegheny County Medical Society.——Dr. William H. Mayer, Pittsburgh, addressed the Cambria County Medical Society, Johnstown, October 15, on "Fundamentals of the Mental Hygiene Problem."——Dr. James G. Koshland addressed the Mifflin County Medical Society, Lewistown, October 1, on mastoiditis.——Drs. Grover C. Weil, Harold G. Kuehner and John Henry, all of Pittsburgh, addressed the Erie County Medical Society, October 6, on the maggot treatment of osteomyelitis.

Philadelphia

Society News.—Drs. Louis H. Clerf and Henry K. Pancoast, among others, addressed the Philadelphia Pediatric Society, October 17, on "Bronchiectasis in Children: Bronchoscopic Observations" and "Modern Roentgenological Interpretations of the Thymus Syndrome," respectively.——The annual postgraduate seminars given on Friday afternoons under the auspices of the Philadelphia County Medical Society will begin, November 13, with a lecture by Dr. Moses Behrend on "Cardiac and Metabolic Changes Accompanying Disease of the Bile Passageways, with Special Reference to Jaundice."——Dr. Robert L. Dickinson, New York, will address the Philadelphia County Medical Society, October 28, on "American and Foreign Experience with Conception Control."

SOUTH DAKOTA

District Medical Meetings.—The following addresses, among others, have been presented at the fall meetings of district medical societies:

Kingsbury, proposed medical legislation, Dr. Willard A. Bates, Aberdeen.
Black Hills, iopax in the diagnosis of kidney tumor, Dr. Anton J. Janis, Rapid City; rôle of surgery in hydronephrosis, Dr. Frederick W. Minty, Rapid City.
Huron, bronchoscopy and esophagoscopy in diseases of the chest, Dr. Thomas R. Gittins, Sioux City, Iowa; compression fracture of the spine, Dr. Archibald F. O'Donoghue, Sioux City.
Sioux Falls, bone tumors, Dr. Anatole Kolodny, Sioux City.
Aberdeen, modern procedures in treatment of prostatic disease, Dr. Gilbert J. Thomas, Minneapolis.
Yankton, tuberculosis in human beings and animals, Drs. Daniel C. Lochead, Rochester, Minn., August E. Bostrom, Waubay, and T. W. Munce, D.V.M., Sioux City.

Society News.—Drs. Faris F. Pfister and Winfred L. Reid, Webster, addressed the Whetstone Valley Medical Society, Webster, August 27, on "Diabetes and the General Practitioner" and "Thyroid Diseases," respectively.——Drs. Andrew J. Paulson, Watertown, and Martin Nordland, Minneapolis, addressed the Watertown District Medical Society at its August meeting on abdominal injuries and treatment of goiter, respectively.——Dr. Stanley R. Maxeiner, Minneapolis, addressed the Sioux Falls Medical Society, Sioux Falls, September 15, on local anesthesia.——Drs. August E. Bostrom, Waubay, and Floyd Coslett, Sanator, among others, addressed the South Dakota Public Health Association, Pierre, October 21-23, on "Tuberculosis as Recorded in the State Department of Health" and "Tuberculosis from a Sanatorium Standpoint," respectively.

TENNESSEE

Personal.—Dr. James A. Crabtree, director of the division of preventable diseases in the state department of health, Nashville, has been appointed assistant professor of epidemiology at Johns Hopkins University School of Medicine, Baltimore, it is reported.

Society News.—Drs. Frederick E. Hasty and Hollis E. Johnson, Nashville, discussed "Paranasal Sinus Diseases and Their Relation to Chest Conditions," and Dr. Horton R. Casparis, Nashville, "Sinus Conditions in Childhood," before the Chattanooga and Hamilton County Medical Association, October 8.——Dr. Lloyd E. Dyer, Greeneville, was elected president of the East Tennessee Medical Association, October 2.——Dr. William F. Copeland, Cornersville, addressed the Giles County Medical Society, Pulaski, September 23, on treatment of angina pectoris.——Drs. Erbie B. Clark, Sparta, and Harlan H. Taylor, Cookeville, presented before the Nine County Medical Society, Monterey, October 1, papers on "Diagnosis of Gallbladder Disease" and "The Infected Cervix," respectively.——Dr. Carl S. McMurray addressed the Nashville Academy of Medicine, October 6, on "Intraperitoneal Hemorrhage of Pelvic Origin."

WEST VIRGINIA

Personal.—Dr. Oscar B. Biern, Huntington, was elected president of the Central Tri-State Medical Society, meeting in Portsmouth, Ohio, September 17.——Dr. Orra F. Covert, Moundsville, was recently elected president of the West Virginia Tuberculosis and Health Association.

Society News.—Dr. Charles Goodman, New York, addressed the Ohio County Medical Society, October 2, on acute conditions in the abdomen.——Dr. Arthur P. Butt, Elkins, addressed the Eastern Panhandle Medical Society, Charles Town, September 9, on "The Physician, the Hospital and Their Relationship to Each Other."——Dr. Howard T. Phillips, Wheeling, presented a paper on lesions of the skin before the Tyler-Wetzel Bi-County Medical Society, New Martinsville, September 9.

GENERAL

Society News.—Dr. J. Bentley Squier, New York, was made president-elect of the American College of Surgeons at the annual meeting in New York, October 15. Dr. Allen B. Kanavel, Chicago, was installed as president and Drs. Charles Gordon Heyd, New York, and W. Edward Gallie, Toronto, were elected vice presidents.

International College of Anesthetists.—At the tenth annual meeting of the Associated Anesthetists of the United States and Canada in New York, October 12-16, it was stated that an international college of anesthetists is being organized by the board of governors of the International Anesthetic Research Society. The purpose of the college will be to standardize anesthetics and relief of pain in hospitals.

Four Weeks of Automobile Fatalities.—The U. S. Department of Commerce announced that, during the four weeks ended October 3, eighty-two large cities in the United States reported 718 deaths from automobile accidents, as compared with 753 deaths during the four weeks ended Oct. 4, 1930. Most of these deaths were the result of accidents that occurred outside the city limits. For the fifty-two week periods ended Oct. 3, 1931, and Oct. 4, 1930, the totals for the eighty-two cities were, respectively, 9,064 and 8,826, which indicate a recent rate of 25.5 per hundred thousand of population as against an earlier rate of 25.4. Six cities reported no deaths from automobile accidents for the last four weeks.

Examination in Obstetrics and Gynecology.—The next examination of the American Board of Obstetrics and Gynecology for group three candidates will be held simultaneously in nineteen cities throughout the country, October 31. Those interested in obtaining the certificate of the board should communicate with Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh, Pa. There are at present about 260 diplomates of the American Board of Obstetrics and Gynecology, which is an examining board created by the joint action of the Section on Obstetrics, Gynecology and Abdominal Surgery of the

American Medical Association, the American Gynecological Society and the American Association of Obstetrics, Gynecologists and Abdominal Surgeons.

Association of Obstetricians and Gynecologists.—The third annual meeting of the Central Association of Obstetricians and Gynecologists will be held, October 29-30, at the Hotel Shoreland, Chicago, under the presidency of Dr. Fred J. Taussig, St. Louis. The principal address will be delivered by Carl G. Hartman, Ph.D., of the Carnegie Institute of Embryology on "The Time of Ovulation in the Menstrual Cycle of Man and Monkey." Other speakers will include Drs. Daniel H. Bessesen, Minneapolis, on "Development of Antiseptic Delivery"; Robert D. Mussey, Rochester, Minn., "Secondary Anemia in Pregnancy"; William F. Mengert, Iowa City; "Changes in the Urinary Tract Following Delivery," and William T. Pride, Memphis, Tenn., "X-Ray Study of 300 Primiparous Patients." At a meeting of the association with the Chicago Medical Society, Wednesday, the work of the White House Conference will be discussed. The association will be the dinner guests of the Chicago Gynecological Society, Friday evening.

Government Services

Term at Naval Medical School Is Extended

The term of the Naval Medical School has been lengthened to eight months, with only one class a year, the *Naval Medical Bulletin* announces. The increasing scope of the curriculum and the fact that it is difficult to find a sufficient number of medical officers available to form a new class at the beginning of the second term were given as the reasons for the change. It was said that work in naval hospitals and other units increases during January and February to such an extent that medical officers cannot be released to attend the school.

Change of Station in the Navy

Lieut. Comdr. Walter J. Pennell from Public Health Service of Haiti to naval hospital, Norfolk, Va.; Lieut. Comdr. Franklin F. Lone from Public Health Service of Haiti to naval hospital, Portsmouth, N. H.; Lieut. Francis H. Webster from Public Health Service of Haiti to naval hospital, Newport, R. I.; Capt. Thurlow W. Reed from the Receiving Ship, New York, to the navy yard, Philadelphia; Lieut. Comdr. Robert P. Parsons, from the naval hospital, New York, to the U. S. S. *Relief;* Lieut. Clifton A. Young, from the naval hospital, Washington, D. C., to Nicaraguan National Guard Detachment; Lieut. Comdr. Horace W. Boone, from Guardia Nacional, Nicaragua, to treatment at the naval hospital, San Diego; Lieut. Comdr. Grover C. Wilson, from the U. S. S. *Langley* to the Norfolk Naval Hospital, Portsmouth, Va.; Lieut. Frederick R. Haselton, from the U. S. S. *Lexington* to the naval air station, Pensacola, Fla.; Lieut. Frank A. Hughes, from the naval station, Guantanamo Bay, Cuba, to the naval air station, Pensacola; Lieut. John F. Luten, from the naval hospital, Mare Island, Calif., to the naval station, Guantanamo Bay.

Army School of Nursing Suspended

The Army School of Nursing, established in 1918 for the training of nurses as a war measure, was suspended, August 12, after a study made by Surg. Gen. Robert U. Patterson had been reviewed by the general staff and approved by the secretary of war. The work of the school will be continued to the end of the current school year to enable the class of 1932 to graduate, but new students will not be admitted. Students admitted in October, 1930, and January, 1931, have nearly all been transferred to civilian schools of nursing. According to a statement issued, October 10, by the surgeon general, the prospective expenditures necessary to replace the temporary housing facilities would have run into large figures. It was further pointed out that the maintenance of a school for professional education in subjects widely taught in civil life is not in keeping with the policy of the war department. The schools maintained by the army are for the purpose of providing instruction in military matters which cannot be obtained in any other place. Finally, it was said that the Army School of Nursing was not an important source of candidates for the Army Nurse Corps. Out of about 880 graduates of the school during its existence, 26 per cent have entered the service for various periods, but at present graduates of the school constitute only about 6.5 per cent of the strength of the corps.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 26, 1931.

Centenary Meeting of Association for Advancement of Science

At the centenary meeting of the British Association for the Advancement of Science held in London, some of the papers read were of especial interest to physicians. The president, General J. C. Smuts, delivered a philosophical address on the "Scientific World Picture of Today." Dealing with biology, he pointed out that, while the whole universe appeared to be dissipating its energy and running down, an exception must be made for life on this planet, where dissipated energy was being taken up and organized into life structures. The recently discovered "quantum" of physics offers a suggestive analogy to life. It follows the all-or-nothing law and behaves as an indivisible whole; so does life. A part of the quantum is not something less than a quantum; it is nothing, or sheer nonentity; the same holds for life. Life is not an entity, physical or other. It is a type of organization. Its nature lies in its constitution more than in its parts. The part in the whole is no longer the same as the part in isolation. Physics and biology are beginning to look not so utterly unlike each other. The gulf between the inorganic and the vital is being bridged. The correct view of life has been obscured by the mechanistic ideas from the crude materialism of the nineteenth century. Up to a point, mechanism has been useful as a first approximation, but if in physics it has lost its savor certainly it is out of place in biology. The partial truth of mechanism is always subtended by the deeper truth of organicity. So far from biology being forced into a physical mold, physics will look to biology and even to psychology for hints and clues. Matter is fundamentally a configuration or organization of space-time, and life is a principle of organization whereby space-time patterns are arranged into organic unities. The next step is to show that mind is even a more potent embodiment of the organizing whole-making principle, and that this embodiment has found expression in a rising series, beginning at the lowest levels of life and ending with conscious mind.

VITAMINS

In the Section of Chemistry, the president, Sir F. Gowland Hopkins, said that all attempts at the isolation and determination of the constitution of vitamins was disappointing. For an adequate diet a few milligrams per kilogram of proteins, energy-forming substances and mineral salts were required of certain other substances (vitamins), and in the case of individual substances small fractions of a milligram per kilogram of the total food consumed. There were at least seven or eight such substances. Some were associated with animal fats; other were more widely distributed. To this day vitamin A was spoken of as fat-soluble and vitamin B as water-soluble, but it was now known that the preparations of these as originally used contained more than one active substance. Those preparations intended to supply vitamin A contained also vitamin D, and those of B had considerable complexity. The former statement was proved by oxygenating animal fats. A was more easily oxydized than D, and when preparations were administered after this treatment certain symptoms of deficiency remained but others were no longer seen. The physiologist's next task was to find out how the potent influence of the vitamins was exercised in the human body and how such minute amounts of material could produce such profound effects. When the synthetic chemist knew all about the constitution of these substances, it was just possible that he might improve on nature and get from the synthetic products still more startling results.

INTELLIGENCE AND FERTILITY

In the Section of Psychology, Dr. Sheperd Dawson said that it was possible that abnormal intellect, either in excess or in defect, might go with lessened fertility. From investigations made in Glasgow, and other available information, one was tempted to conclude, however, that the less intelligent elements of the population were increasing at a greater rate than the more intelligent and that in time they might vastly outnumber them. It was possible that some of the schemes now put into operation to promote welfare might be doing something to preserve and multiply the dull and so accentuate social problems.

OXYGEN IN MOUNTAIN CLIMBING

In the Section of Physiology, the value of oxygen in mountain climbing was discussed by a physiologist and two climbers, of whom one was a physician. Professor Barcroft made investigations in a steel chamber wherein the barometric pressure was reduced to that at the top of Everest (11 inches of mercury). In the chamber, the exertions necessary for climbing 1,000 feet an hour were made by stepping on and off a block of wood 13 inches high. Although an ordinary person would faint in air at such low pressure, it was found that " the climb" could be done just as easily as outside at ordinary atmospheric pressure. Given the necessary oxygen, the drop of barometric pressure had no effect. Against this advantage there would be in mountain climbing such difficulties as the weight of the apparatus and the effect of frost on the valves and tubes.

Mr. E. N. Odell of the Everest 1924 expedition said that the big attacks on the summit of Everest in 1922 were made by Mallory and others entirely unequipped with oxygen; they reached 29,000 feet. The 1924 expedition was equipped with oxygen, which was in his charge. The attempt on the summit was made from the sixth camp at 27,000 feet and they were all of open mind as to the utility of oxygen. Mallory and Somervell in 1922 thought that the main factor was acclimatization and not oxygen. Finch maintained that, using oxygen all the way from 20,000 feet, time was saved and there was more probability of reaching the top. Others held that with such speed of climbing there was grave danger of collapse in the event of failure of the apparatus. In the 1924 expedition, they found they did not get the benefit others previously had obtained; 28,000 feet was reached entirely without oxygen. The full weight of three cylinders was 35 pounds, a considerable weight at 27,000 feet. The conclusion after the expedition was that in any future expedition the good of oxygen would be for the last few hundred feet. A subsequent trial in North Wales confirmed the view that the value of oxygen was in a final pick-me-up, for which 15 cubic feet would suffice.

Dr. Raymond Greene, physician of the Kamet expedition, insisted on the utility of oxygen in high climbing. Finch found that above 21,000 feet it made light a strenuous day's work. At 25,500 feet, Finch and Bruce passed the night in numbing cold threatening disaster till they tried the effect of oxygen. In a few minutes it produced a tingling sensation of returning warmth. Oxygen they considered saved their lives that night, and next day they climbed 1,800 feet at 900 feet an hour against only 330 at lower altitudes. Lack of oxygen produced greatly accelerated heart action and rendered frost bite more likely. The solution of the problem was slow climbing to a point at which the summit could be rushed with the aid of oxygen.

On the motion of the president, Dr. Dale, it was agreed to appoint a committee to go into the provision of suitable oxygen apparatus which mountaineers would think worthy of trial.

THE MECHANISM OF EVOLUTION

Prof. E. B. Poulton, president of the Section of Zoology, said that the first meeting of the association he attended, in 1881, was the last meeting at which opposition was offered to evolution as apart from its causes. Thereafter the battles in the section had been over Lamarckism and natural selection and their factors, especially heredity. Evolution itself had been generally accepted. None of the theories of those who would limit the power of natural selection were valid. What other hypothesis would explain mimicry? Some naturalists believe that the resemblances have no biologic significance. Such chance likenesses in patterns of butterflies have been shown by Dixey to be relatively few and to exist only where the patterns are simple. Professor Study of Bonn showed the impossibility of explaining mimicry by chance resemblance. It had been suggested that mimetic resemblances were due to model, and mimicry independently passing through the same stage of evolution. But, as pointed out by Lord Rayleigh, this would not explain the resemblance of insects to bark or twigs or leaves.

In the discussion, the veteran American paleontologist Prof. H. F. Osborn said that science was at a loss more than ever to explain the causes of evolution. He rejected natural selection, the origin of adaptations from fortuitous mutations, but held that the direct influence of the environment on the germ plasm —one of Darwin's own beliefs—was proved, and that paleontology had proved a number of laws by which evolution was controlled. Dr. Broom, the distinguished South African paleontologist, was not in full agreement with Professor Osborn's interpretation. The discussion showed that there was no general agreement as to the mechanism of evolution.

Gas Warfare Anticipated: Faraday's Views

Every discovery seems to have been anticipated in some form and the fact overlooked until unearthed by some student of the past. For the approaching Faraday centenary celebrations an exhibition is to be opened at the British Museum. A copy of the *Philosophical Transactions of the Royal Society* published in 1832 will be shown containing the paper in which Faraday first communicated his great discoveries on the relation of electricity and magnetism. But the most interesting relic to be exhibited is a confidential report from Faraday on the "secret war plan" of Lord Dundonald's for the capture of Cronstadt, submitted to the admiralty and dismissed as "infallible, resistless but inhuman." One suggestion was a concealing smoke screen emanating from iron vessels containing "combustible materials," such as bituminous coal. The other was the introduction of poison gas by means of sulphur vessels, "the fumes from which will drive away artillery men or stupefy them." Faraday reported that "dense smoke will hide objects and burning sulphur will yield fumes that are intolerable and able to render men involved in them incapable of action or even kill them." But he adds that if the project were known it would not be difficult for the attacked party to provide respirators which "would enable the men in a very great degree or even altogether to resist the temporary invasion of an atmosphere such as that described."

The Faraday Centenary

The centenary of Michael Faraday's discovery of electromagnetic induction, on which is founded the whole fabric of electrical engineering and the use of electricity in medicine, has been celebrated in London. The government, foreign and British scientists and electrical engineers, including Marconi, united in paying tribute to "the prince of experimenters." Sir Arthur Schuster thus sums up: "Of all men who have spent their lives in the search for experimental discoveries, no one has ever approached Michael Faraday in the number, variety or importance of the new facts disclosed by his labors." The German scientist Prof. P. Zeeman, who took part in the celebrations, placed in order of importance Faraday's discoveries of electromagnetic induction, of the chemical decomposition of a liquid by an electric current, and the magnetic rotation of the plane of polarization of light. Faraday was no mathematician and it remained for the genius of Clerk Maxwell to give mathematical expression to his discoveries, but in all his work he was guided by a profound faith in the unity of natural phenomena and especially by the fact that effects in one region are paralleled by similar ones in some other. In chemistry his work is funda-

mental. He discovered the two main quantitative laws underlying electrolysis—that the amount of chemical decomposition is proportional to the quantity of electricity employed (i. e., strength of electric current multiplied by time), and that the amounts of different substances set free by the same quantity of electricity are proportional to their chemical combining weights. He thus established a close relation between electricity and chemical combination. Many years afterward, Helmholtz pointed out that Faraday's laws of electrolysis indicated the existence of "atoms" of electricity. Thus was foreshadowed the fundamental discovery of the electron by J. J. Thomson at the close of the nineteenth century. The terms electrode, anode, kathode, ion, anion, cation, electrolyte and electrolysis were introduced by Faraday and are still used with the significance he gave them.

A Faraday centenary exhibition was opened at the Albert Hall by the president of the British Association, at which Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, speaking by relayed message from Boston, delivered greetings of American scientific societies. The exhibition instructively displays in the center the actual apparatus—now looking so primitive—with which Faraday worked, and around it all the latest applications of electricity to chemistry, engineering, and other fields.

PARIS

(From Our Regular Correspondent)

Sept. 16, 1931.

International Congress on Medicinal Plants

The fourth Congrès international des plantes médicinales et à essences was held at Paris in the quarters of the Faculté de pharmacie. A great number of widely different questions were discussed; among others, the causes of the activity of medicinal plants according to exterior conditions, climate, altitude, cultivation; the divergencies in different species between the toxicity and the content in pharmacodynamic active principles, and, finally, the reasons for the abandonment by physicians of the therapeutic use of numbers of medicinal plants and their galenic derivatives. Among others, papers were read by Dr. Walter Hacht of Vienna on "Essais bioclimatiques sur les plantes médicinales"; Dr. Lajos Szahlender on "Le dosage de la rancidité des graines oléagineuses"; Dr. Bosheert on fertilizers for the cultivation of different qualities of digitalis; Professor Dietzel on the formation and the biologic significance of alkaloids; Professor Muszinski on the state of culture of medicinal plants in Poland, and the attempts at acclimatization of the soy bean at Vilna; Prof. Emile Perrot on the production of medicinal plants in France and in northern Africa; Dr. Strauss on the cultivation of peppermint and the production in Europe of the essence of peppermint. The members of the congress visited, during their stay in Paris, gardens of medicinal plants at Milly and Etréchy. Finally, they took up the unification of commercial terms for medicinal plants and plants furnishing essences (international nomenclature); the creation of an international codex of vegetable drugs, and the fixation of the prices of certain drugs, taking account of their activity or of their content in active principles. An exposition of medicinal plants grown in France and in the French colonies, held at the Faculté de pharmacie, comprised more than 800 different specimens. The opening of the exhibit took place under the chairmanship of Mr. André Tardieu and Mr. Louis Rollin, minister of commerce. The idea of an international organization that would distribute, according to the climates of the producing countries, the "simples" most used in pharmacy was discussed at some length. France, which, with its colonies, can produce a large number of different plants, imports every year considerable quantities of medicinal plants. During 1930, nearly a million kilograms was imported. Unquestionably a large number of these plants can be grown in our climate, and it would be to the interest of France to take measures to intensify their production. That would promote the utilization of arid areas, which are perfectly well adapted for a number of medicinal plants.

The International Federation Against Tuberculosis

The annual meeting of the council of the Union internationale contre la tuberculose, the president of which is Professor Frölich of Norway, was held in Paris, at the headquarters of the "union," 2 avenue Vélasquez. Seventeen countries sent delegates. The next meeting of the Union internationale will be held at The Hague, Sept. 6-9, 1932. The following topics, selected from a list of subjects proposed by the countries belonging to the "union," will be on the program: "Relations Between Allergy and Immunity," the speaker to be designated later; "Gold Therapy," to be presented by Professor Sayé of Barcelona, and "Postsanatorial Aid," by Dr. B. H. Vos of Hellendoorn (Netherlands). Following the precedent adopted at the conference in Oslo, ten collaborators will be designated in different countries for each topic, in addition to the principal speaker. The scientific session was held in the new "tuberculosis laboratories" of the Institut Pasteur, which the members of the council inspected, being conducted by Professor Calmette. The session was devoted to the paper of Dr. Soper (United States) on "A Standard Plan for the Antituberculosis Crusade." In the absence of Dr. Soper, the paper was presented by Professor Opie (United States). Following Dr. Soper's paper, Professor Valtis of Greece explained the stages in the antituberculosis crusade in his country. These two papers were followed by a discussion in which Prof. Léon Bernard, general secretary of the "union," Prof. Knud Faber of Denmark, Colonel Rudzki of Poland, and others, participated.

The Meeting of the Confederation of Medical Syndicates

The harmful effects of the social insurance law has been attenuated by the creation of control committees to adjudicate differences that arise between the three parties concerned: the insured, the physicians and the administrators of the health insurance societies. The physicians are unfortunately in the minority. But, in a paper read at the last meeting of the Confédération des syndicats médicaux de France, Professor Vanverts of Lille made the reassuring statement that the physicians designated to serve on the control committees assume a preponderant rôle because of the scrupulous honesty they displayed in the performance of their duties. They go to any limit to defend their colleagues when they are accused unjustly but they are pitiless in condemning those who have been convicted of dishonest practices. Fortunately, of such there are few. In all the cases that have arisen, the physicians who are members of the control committees have been the first to demand severe and exemplary penalties in order to uphold the honor of the profession. The result has been that the number of physicians convicted of dishonest practices has diminished until the number is negligible; for physicians inclined to be dishonest are certain they will not be defended by their colleagues; hence the confidence in the physicians serving on the control committees has greatly increased. At the same meeting of the Confédération several important questions were brought up. The Commission du droit syndical has revised the by-law of the confederation that deals with medical specialists and has set up a system of compulsory arbitration. The "commission" took action also with regard to various matters pertaining to antituberculosis and antivenereal dispensaries and with reference to consultation centers for expectant mothers and mothers with nurslings. The question of physicians at the frontiers was taken up and a resolution passed concerning the practice of medicine among civilians by army physicians. Since army physicians owe all their time to the army and are accorded special privileges (use of rooms, apparatus, instruments, exemption from license-tax), they should not compete in a dishonest manner with their civilian colleagues. The confederation has taken steps to obtain a governmental decision formally prohibiting army physicians

from accepting patients among the civilian population. In special cases, in order to meet the needs of certain colonial areas, the federation considers that army physicians should be permitted to practice among civilians but only on the authorization of the prefect, which should be renewed every three months. The confederation decided to make an investigation and to collect statistics on the practical results secured from the application of antidiphtheritic vaccination with anatoxin and from antituberculosis vaccination with the B C G vaccine.

Wireless Medical Consultations at Sea

The minister of the postal, telegraph and telephone services has decided that, beginning September 1, boats at sea may request medical consultations by wireless of the coastal stations Le Havre-Radio, Saintes-Marie-de-la-Mer-Radio, Marseille-Radio and Bordeaux-Port-Radio, when the boat has no physician or when a grave and urgent case arises. Benevolent groups of physicians in the regions mentioned have made possible the organization of this service. The consultations will be given gratuitously, by wireless, within as short a time as possible.

The Scientific Study of Sex

On the initiative of Dr. Toulouse, an association for the scientific study of sex has been founded. The purpose of this group of scientists is to study the multifarious problems arising out of sex relations, as they affect the social order and the well being of the individual. Education in relation to sex hygiene, eugenics and the rational protection of motherhood will occupy the particular attention of the association. At the constituent assembly, Mr. Justin Godart, formerly minister of health, was elected honorary president and Dr. Toulouse was chosen president.

BERLIN

(From Our Regular Correspondent)

Sept. 7, 1931.

Proposed Changes in the Organization for Cancer Control

The crusade against cancer, which physicians have always waged with great energy, has in recent years awakened an increasing and widespread interest among nearly all classes of the population. In nearly all civilized countries organizations have been established to promote research on a cure for cancer. In Germany, in addition to the smaller voluntary and official organizations, there are the leagues of the provinces and, of more recent creation, there is the Reichsausschuss zur Bekämpfung des Krebses.

In a memorial addressed to the ministry, the faculty of medicine of the University of Frankfort-on-Main expresses its satisfaction with these movements, but states that it cannot approve all the proposals that have been made or all the suggested forms of organization.

Owing to refinements introduced into medical diagnosis, to the lengthening of the average span of life, possibly also to an actual increase of cancer, but particularly as a result of increased discussion of the cancer problem in magazines and in the daily press, a somewhat panicky attitude toward cancer has developed among the general public, which, exploited by selfishly interested groups, gives rise to the danger that the combating of cancer will be driven from its true course and will embark on unknown and dangerous seas.

Moved by these considerations, the large associations of specialists that have the most to do with the practical combating of cancer—the Deutsche Gesellschaft für Chirurgie, the Deutsche Gesellschaft für Gynäkologie, and the Deutsche Röntgengesellschaft—have announced their position with regard to the problem, and in a resolution have expressed their disapproval of a portion of the plans proposed. Above all, the dictum pronounced by a number of physicians, "Cancer is today a curable disease if diagnosed early," is untrue as a wide generalization. Every expert knows that, for example, cancer of the lung or cancer of the stomach, the pancreas or the gallbladder can almost never be healed permanently, even though it is diagnosed early; that also in the case of cancer forms that are more frequently curable, as cancer of the uterus and cancer of the breast, it often happens that in spite of the earliest operation a recurrence follows; that, furthermore, cancer of the liver when finally diagnosed is always, and cancer of the ovary usually, of a secondary nature, although as a rule the primary seat of the cancer is not clinically demonstrable. That is the reason why every physician possessed of human sympathy and fully conscious of his responsibility toward his fellow men is careful not to diagnose "cancer" other than after the most detailed investigation. According to reliable statistics, only in from 40 to 50 per cent of the cases of cancer of the uterus that are treated early or in season is a lasting cure effected. Taking the cases of cancer of the uterus as a whole, in only from 20 to 25 per cent is an enduring cure accomplished.

The proposal to erect central cancer hospitals gives rise to grave doubts. The faculty of medicine can in no wise support the view that, through the erection of special cancer hospitals, or, to use a euphemistic term, special radiotherapeutic hospitals, the results in the treatment of cancer would be greatly improved. The two remedies that to date have proved effective in the treatment of cancer are operation and irradiation. In numerous cases the surgical operation, performed in due season and in an expert manner by the specialist on the ground, remains the method of choice. Irradiation, along with the surgical form of intervention, has won for itself an honorable place. It is, however, a gross exaggeration of the merits of radiotherapy and unwarranted by the facts in the case when many give out the impression that cancer treatment and radiotherapy are identical and that all that is needed to improve many fold the results of cancer treatment is to develop radiotherapy to a higher point of efficiency. The fact is, in most forms of cancer, surgical intervention yields far better results than radiotherapy, and in the other forms of cancer (for example, gynecologic cancers) the question is not decided whether it is better to operate or to irradiate. It is held, too, that the natural and healthy development of research and instruction would suffer an interruption if the demand for special cancer hospitals, or, with the use of a euphemistic name, for special radiotherapeutic hospitals with cancer treatment, should be complied with. Through improvement of the existing arrangements, together with new creations, and especially through the establishment and development of professorial chairs for general clinical roentgenology, purchase of greater supplies of radium, improvement of apparatus, promotion of cancer research and the like, a guaranty will be furnished that the students and physicians will be thoroughly trained in roentgen diagnosis and roentgen therapy in accordance with the best views of the time. In this way, and with the expenditure of much smaller sums than would be required for the erection of special cancer hospitals, it will be possible to make further progress in the crusade against cancer and thus to promote the general welfare of the people.

Warning—The "Save Your Natural Eyesight" Movement

The Verein rheinisch-westfälischer Augenärzte in Solingen has called attention to the fact that a form of treatment by which eye disorders are supposed to be healed by seeing exercises and irradiations without operation, and errors of refraction are alleged to be corrected without spectacles, has been introduced into Germany from America. A warning must be issued to the public against the false principles on which, in recent months, the treatment in the so-called *sehschulen* is based. The Berliner Augenärztliche Gesellschaft has expressed itself in much the same manner. The federal bureau of health, as may be noted in a decree of the Prussian minister for public welfare, has expressed itself to the effect that it is misleading when the

sehschulen announce in their widely circulated prospectus the slogan "away with spectacles and eye-glasses," since errors of refraction are caused by a defective structure of the eye, and presbyopia in elderly persons by a reduced elasticity of the crystalline lens. Such defects can be relieved only by corrective lenses that influence the rays of light in such a manner that a distinct image is again produced on the retina. An improvement through exercise or irradiation is impossible, according to the scientific point of view. It is not only misleading but even dangerous when it is proclaimed that diseases that can ordinarily be cured only with the aid of medicaments or through operation can be favorably influenced by the new method. There are eye disorders in which an operation under certain circumstances may be urgent and any postponement subjects the patient to the danger of blindness. The propaganda of the *sehschulen* is, therefore, a menace to health, since some patients will be prevented from summoning timely and suitable aid. The propaganda constitutes a faker-like advertising of one therapeutic method for all eye diseases. Hence, the methods employed by the *sehschulen* may be designated as quackery. Of course, this criticism does not apply to the endeavors put forth by public organizations to bring aid to children with weak eyes through special instruction. The latter movement, as the minister of public welfare expressly emphasized, has proved of great value.

BUDAPEST

(From Our Regular Correspondent)

Sept. 23, 1931.

Cardiac Injections

Prof. Dr. Arthur Hasenfeld, who delivered an address on the resuscitation of the heart's function by means of cardiac injections, at the National Medical Congress at Balatonfüred, said that the most widely accepted new method of resuscitating the heart is by injections into the heart cavities. The technic of the method is fairly simple. A fairly long needle and a record syringe are used. The needle enters on the left side, directly beside the sternum, in the fourth intercostal space. The chest wall is from 2 to 4 cm. thick, while the thickness of the wall of the right ventricle is 4 or 5 mm. Passing a needle of 6 cm. from 4 to 5 cm. deep, one surely reaches the right ventricle. The cessation of resistance is felt when the needle enters the cardiac cavity. Prior to injecting the medicine the operator pulls up the piston of the syringe; if blood appears in it, the contents of the syringe can be safely injected. The needle must be pulled out with the syringe on, lest air enter the heart cavity. While intracardiac injections can be resorted to in all cases in which the heart stops unexpectedly, it is chiefly cases of general anesthesia, or of injuries, and cases of postoperative shock that offer the best chance for resuscitation. Since the injection has to be given quickly, Hasenfeld deems it necessary that all clinics and every operating theater be equipped with all utensils and drugs, to be ready if needed. The occurrence of sudden death shows a decided rising tendency, largely as the result of the great spread of syphilitic heart diseases, the rise of the average general duration of life, and the more intensive treatment of heart diseases, which is apt to prolong life so that these patients live longer than such patients used to live. Modern diagnostic methods and mainly electrocardiography render it possible in most cases to recognize the imminent danger of sudden deaths from heart disease.

Increase in Diseases of the Circulatory Organs

At a recent meeting of the Royal Society of Hospital Physicians, Dr. T. Szel said that, in contrast with the constant decrease of the general death rate in the last ten years, some diseases have become more frequent. Such are the diseases of the circulatory organs and particularly heart disease and heart failures due to dilatation. The causes responsible for the increase of circulatory troubles are both apparent and real. Apparant causes are the decrease of all infectious diseases, and the increase of the population. Deaths due to circulatory diseases amounted only to 2 per cent of the general death rate in 1897, while in 1928, they amounted to 10.3 per cent. But their rate per hundred thousand of population increased as well: from 55 in 1897 to 175 in 1928. There are other causes for the increase, however: in recent times, such deaths have been more accurately recorded, for the number of medical coroners has increased. Veritable causes are the change in composition of the population and the actual spread of such diseases. Diseases of the circulatory organs increase with advanced age, and since the number of old people has increased, the rate of circulatory troubles and arteriosclerosis is on the increase. According to authentic statistical data, circulatory troubles in Hungary are twice as common in the urban as in the rural population. The index in Budapest is 216 against 100 in the country. There is no other single group of diseases which shows such a difference in incidence in cities and in the country. The chief cause of the increase is the great spread of arteriosclerosis among men, particularly in the urban population, and this again is attributable to the abuse of nicotine and alcohol and also to syphilis. The ravages of alcohol and of syphilis are most marked in the city proletariat and the laborers; to this and to their hard physical work is due the spread of circulatory troubles observed in these groups. According to the statistics of the Hungarian workmen insurance and sickness clubs, 3 per cent of all disabilities are due to heart troubles.

The foregoing data not only relate to Hungary but are of international character. Most circulatory deaths occur in the southern European states: Italy, Spain and Bulgaria; there are fewer in Lettland, Lithuania and Norway. It is probable that in the southern countries the heat acts on the heart detrimentally. In the statistics of the European cities unfavorable conditions prevail in Munich, Germany, where almost every second man suffers from dilatation of the heart due to excessive beer drinking. The dilated "bier-herz" is more frequent in Bavaria, where it is a general custom for men to drink from 4 to 8 liters of beer daily.

The Congress of the International Medical Association

The International Medical Association held a meeting at Budapest, September 9-12. This organization, now five years old, regularly holds its meeting in Paris, but the council resolved at its meeting last year that the sixth meeting be held at Budapest. This meeting was attended by delegates of the medical profession from Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Hungary, Lithuania, Spain, Sweden, Switzerland and Yugoslavia. Dr. Narbeshuber, chairman of the association of the Austrian groups, presided while current affairs were reported on by Dr. Fernand Decourt, secretary and editor of the official gazette, the *Revue internationale*.

The two main subjects of the deliberations were social insurance and the public hygiene of villages. Most of the time was occupied by the former subject, which at present is of the utmost interest to physicians all over the world. There is not one state in Europe where this important social question has been solved to the full satisfaction of physicians. The complaints of physicians are everywhere the same. The administration puts physicians in the background, so that one can say without exaggeration that physicians are only a poorly paid medium of the institution, although they perform its most important function. It is time that the medical profession of every country should conserve its rights. It was decided at the meeting that the most important task of the association in this question is to establish principles the accomplishment of which had to be urged by physicians. These principles were elaborated by the association in 1928 and compiled in eighteen paragraphs, but on the ground of the experience gained since that time this "charta" of the medical profession needed modification. The present meeting supplemented the resolutions brought three years ago with three important paragraphs. The standpoint of the Inter-

national Medical Association culminated chiefly in the principle that the community at large needs social insurance for its financially weaker strata; but, as the pillar of the institution of social insurance is the medical profession, adequate influence in the management of its affairs has to be insured for the physicians. In the insurance work, physicians should keep their moral and financial independence, and as the basis and principal factor of healing is the trust of patients in their physicians, the carrying through of the principle of free choice of physicians everywhere is implicitly necessary.

The congress thoroughly debated the question of village medical service. The discussion of this theme was necessitated by the circumstance that it has been debated this year also by the European conference acting under the League of Nations. The congress discussed some less important subjects and finally resolved that the seat of next year's congress be Geneva. Dr. Schaeftgen, the representative of the medical profession of the grand duchy of Luxembourg, was designated as president for the future congress.

The Hungarian National Medical Association did everything in its power to entertain the delegates. The city of Budapest gave a banquet at Janos Mountain. Next day, on behalf of the ministry of public welfare, Dr. Scholtz, state secretary, gave a lunch at the Hotel Hungaria, and the same evening, a dinner was given on Margaret Island. After the congress, the guests were taken to Lake Balaton, the Hungarian sea, where they were the guests of the city of Budapest; next day by steamboat they visited the fish-biologic institute at Tihany.

Curtailment of Publication of Medical Papers

The economic policy of the government aims to prevent the exporting of money by the compulsory reduction of imports. As the domestic paper factories are unable to meet the demand, four fifths of the paper necessary for the press has been imported. A new order, issued by the ministry of finance, requires that newspapers and either trade or scientific periodicals reduce their size to about half. The order is a great hindrance to the medical journals, which have on hand many manuscripts. The press association expects to make representations to the government to revoke the order as regards literary and scientific periodicals, for which this order amounts to a catastrophe. If the government will not revoke the order, some periodicals will have to stop publication.

BELGIUM

(From Our Regular Correspondent)

Sept. 8, 1931.

International Bibliographic Bureau of Military Medicine

The Office international de documentation de médecine militaire, created last year at Liége, held recently at Brussels the first series of bibliographic conferences. More than 145 registrations from fourteen countries show the interest aroused by the program. General Demolder, inspector general of the medical corps of the Belgian army, welcomed, in the name of the officers of the corps, the foreign colleagues and thanked them for the honor shown Belgium by the choice of Liége for the headquarters office.

General Spire of the French army medical corps delivered an address in which he set forth the principles of sanitary tactics.

Colonel Felton of the United States Army Medical Corps discussed eye injuries on the firing line. Persons whose vision is impaired by trauma are, indeed, wounded men of a special type, both from the standpoint of their psychologic reactions and from the special treatment that they require. Such wounded men should be quickly evacuated to an ophthalmologic center where they will secure suitable treatment.

Colonel Vivie read an address, prepared by Colonel Gravellat of the French army medical corps, on "The Hygiene of the European Soldier in the Colonies." After calling attention to the sanitary disasters that commonly befell colonial expeditions in the early day, the speaker described present conditions as affecting recruitment, transportation and life in general in tropical climates.

Colonel Thomann, pharmacist in the Swiss army, presented a film devoted to the organization and the tactical use of mountain sanitary companies. These sanitary companies present a number of peculiar features that are the consequence of the conditions of their functioning in the mountains. This formation reenforces the regular formations, or it may evacuate them or hospitalize them. While diagrams represented graphically the organization of the sanitary company, the film showed the functioning in the marvelous setting of the mountain region. An interesting informal discussion took place between the speaker and some of his hearers on the subject of the practicability of the upright litter (patient seated), the utilization of pack mules, and the recruiting of stretcher carriers.

Major Georgevich of Yugoslavia presented a study on the new ideas concerning the virus of tuberculosis, and their applications to prophylaxis in the army. It was a comprehensive research, which gave a complete history of the question and took up in detail the present-day conceptions. The speaker then considered the applications of these conceptions in the domain of military hygiene.

Lieutenant General Demolder presented the results of the investigations of the international agreement for the improvement of the lot of the wounded and the sick of armies in the field. The speaker told of the many difficulties in the elaboration of the new regulations. The principles of the convention of 1906 are retained but are explained more in detail wherever, in practice, it was found that there were difficulties of interpretation, and are given more completely wherever omissions were observed. Thus, new provisions were introduced concerning military aviation. Likewise, the protection of the Red Cross emblem was strengthened. He called attention also to article 30, according to the terms of which, on the demand of a belligerent and according to the method to be decided on by the parties interested, an inquiry must be opened with regard to any alleged violation.

Colonel Schickelé of the French army medical corps, who discussed the problem of sanitary evacuation, reached the following conclusions: Modern warfare complicates the problem of sanitary evacuation, but fortunately the technic of transportation improves the means of action. One can therefore hope for a satisfactory solution. For that purpose, it is indispensable that sanitary evacuations shall not be considered solely from the standpoint of the technic of transportation but rather as an act of medicosurgical technic. Sanitary evacuation cannot be distinguished from evacuation. The purpose to be accomplished is the same: the best possible functioning of the health service of the armies in the field, in order to bring about more rapidly the recovery of the patients.

Lieutenant Colonel Babecki of the Polish army medical corps presented a study on the prophylaxis of intestinal infections in the army. These infections—among others typhoid, the old scourge of armies—made enormous ravages among the troops of all the belligerents at the beginning of the war of 1914-1918. Then, under the influence of vaccinations combined with the strengthening of hygienic measures, a steady retrogression of these diseases was brought about. The speaker explained then how the Polish army, profiting by the experience of the World War, organized its defense against these diseases.

Major De Block of the Belgian army medical corps presented a didactic film of the Belgian army, "Le sachet de pansement." After revealing what was the nature of the aid to the wounded in the wars of the past, the film showed the great accomplishments of the Belgian army medical corps during the World War. Better than the most detailed explanations, the film instructed the soldier in the use of the pad used to stop the flow of blood in a wound. The comments of the audience showed their interest in the film.

Major Sillevaerts, head of the health department of the air service of the Belgian army, gave his ideas on the special training of a physician for the air service. The air service demands of its physicians technical specialization made necessary by the selection of candidates for training in aviation. To fulfil his mission completely, the air service physician should know through personal experience the psychic and physical reactions that he is expected to supervise. Some aviation congresses have gone so far as to demand that an air service physician shall hold an air pilot's license. The speaker explained the system now being tried out in the Belgian army: a short course for young physicians in an aerodrome when they complete their course in the "school of application," to be followed by actual experience in flying.

Colonel Van Baumberghen of the Spanish army medical corps presented a study on the modern characteristics of sanitary equipment. The speaker is particularly well qualified to treat the subject, since he has served for many years as a member of the committee on the standardization of sanitary equipment. He emphasized the difficulties of the problems to be solved, which have to do with questions of a medicosurgical, technical, strategic and economic nature. He pointed out the importance of the standardization of this equipment, which is the natural first step toward a more complete standardization.

Lieutent Colonel Voncken of the Belgian army medical corps spoke on international law with relation to the health service. After considering first the origins and the foundations of international law, the speaker pointed out the constantly increasing extent of its applications to the health service. He emphasized that the military physician will remain the only representative of the doctrine of pity in the midst of the unleashed passions of war.

It was decided that the sessions of the bureau shall be held alternately at Liége (for the even years) and at the headquarters of the various international congresses of military medicine and miltary pharmacy (for the odd years). The next session will be held at Liége, at the headquarters of the bureau, June 2-4, 1932.

Among the American delegates at the conference were Colonel Fenton, Commander Bainbridge, Captain Pryor and Major Hume. This group of officers, together with the ambassador of the United States, conferred on General Demolder, at the close of the conference, the cross of the Military Surgeons Association.

The Office international de documentation de médecine militaire has developed during recent years. Functioning in part independently and in part through international collaboration, it has already secured the partial cooperation of the United States.

Marriages

DICKINSON WOODRUFF RICHARDS, JR., New York, to Miss Constance Burrell Riley of North Plainfield, N. J., September 19.

DAVIS E. HEMINGTON, Uniontown, Pa., to Miss Florence I. Reid of Brockville, Ont., Canada, September 15.

BEN FRANKLIN KILGORE, Waterloo, Ill., to Miss Florence Martha Gieseke at Monmouth, September 15.

RAY BARLOW HARRIS, Brighton, Maine, to Miss Florence Jennette Duncon at Athens, September 5.

RICHARD W. SPICER, Winston Salem, N. C., to Mrs. Stuart Hayden Rogers of Greensboro, August 31.

PETER J. KAPO, Philadelphia, to Miss Violet D. Mockaitis of Mahanoy City, Pa., September 26.

TROY HOWELL HUTCHINSON, Wise, Va., to Miss Jo Ann Martha Donohue of Sun, October 7.

RAYMOND KEITH O'BRIEN, St. Petersburg, Fla., to Miss Zita Norpell of Chicago, June 24.

BLOYCE HILL BRITTON, El Paso, Texas, to Miss Helen Sterling Williston, September 5.

Deaths

Charles Wilson Kollock, Charleston, S. C.; University of Pennsylvania School of Medicine, Philadelphia, 1881; member of the South Carolina Medical Association, American Academy of Ophthalmology and Oto-Laryngology and the American College of Surgeons; emeritus professor of rhinology and laryngology, Medical College of the State of South Carolina; served during the World War; laryngologist and rhinologist to the Roper Hospital; aged 74; died, September 23, of amyotrophic lateral sclerosis and chronic myocarditis.

Henry Thibault ✠ Scott, Ark.; University of Arkansas School of Medicine, Little Rock, 1900; past president of the Arkansas Medical Society, and secretary of the Lonoke County Medical Society; formerly associate professor of medicine at his alma mater; member of the school board; aged 53; died, September 14, of tuberculosis.

Peter Henry Jobse, Wilsonville, Ore.; Northwestern University Medical School, Chicago, 1894; formerly professor of genito-urinary and clinical surgery, Milwaukee Medical College; member of the American College of Surgeons; aged 62; died, September 23, in St. Vincent's Hospital, Portland, of perforating duodenal ulcer.

Calvin Ross Elwood ✠ Menominee, Mich.; University of Michigan Medical School, Ann Arbor, 1894; member of the American Academy of Ophthalmology and Oto-laryngology; served during the World War; on the staff of St. Joseph's Hospital; aged 61; died, September 18, of coronary thrombosis and chronic myocarditis.

Harry Eugene Williams, Jr., Pine Bluff, Ark.; Tulane University of Louisiana Medical Department, New Orleans, 1908; member of the Arkansas Medical Society; on the staff of the Davis Hospital; aged 46; died, August 22, in New Orleans, of cerebral hemorrhage and chronic nephritis.

George Rucian Hubbell, Petaluma, Calif.; Cooper Medical College, San Francisco, 1890; member of the California Medical Association; served during the World War; formerly city health officer; aged 64; died, September 15, in the Mount Zion Hospital, San Francisco.

George Cooper, London, Ont., Canada; Medical Faculty of Trinity University, Toronto, 1892; University of Toronto Faculty of Medicine, 1906; served during the World War; on the staff of the Ontario Hospital; aged 50; died, August 15, in St. Joseph's Hospital.

Edwin B. Strong, Rockford, Mich.; Detroit College of Medicine, 1887; member of the Michigan State Medical Society; for twelve years member of the school board; on the staff of St. Mary's Hospital, Grand Rapids; aged 68; died, September 20, of heart disease.

Louis Norman Yerkes, Mason, Mich.; Michigan College of Medicine and Surgery, Detroit, 1904; member of the Michigan State Medical Society; served during the World War; aged 68; died, September 14, of an infection following a minor leg injury.

Thomas Knox Mullins, Huntsville, Ala.; Atlanta College of Physicians and Surgeons, 1898; member of the Medical Association of the State of Alabama; veteran of the Spanish-American War; aged 56; died, September 19, of heart disease.

Charles Francis Archambeault, Troy, N. Y.; Albany Medical College, 1894; member of the Medical Society of the State of New York; formerly coroner, school physician and police surgeon; aged 56; died, September 20, of heart disease.

Daniel C. Case, Slingerlands, N. Y.; Albany Medical College, 1870; member of the Medical Society of the State of New York; aged 84; died, September 21, in Providence, R. I., of intestinal obstruction due to an operation for adhesions.

Thomas Morris Hayden, Fresno, Calif.; College of Physicians and Surgeons, Keokuk, Iowa, 1874; member of the California Medical Association; aged 77; died, August 3, of perforated duodenal ulcer, peritonitis and acute uremia.

Benjamin Alonzo Cathey, Portland, Ore.; Willamette University Medical Department, Salem, 1890; member of the Oregon State Medical Society; aged 77; died, August 18, of nephritis, coronary thrombosis and pneumonia.

Henry Joseph O'Brien ✠ St. Paul; University of Pennsylvania School of Medicine, Philadelphia, 1888; on the staffs of St. Joseph's Hospital and the Miller Hospital; aged 69; died, September 16, of cerebral hemorrhage.

Louis O. Home, Linneus, Mo.; Missouri Medical College, St. Louis, 1884; member of the Missouri Medical Association; formerly county coroner; aged 74; died, September 1, of acute myocarditis and infection of the prostate.

Azariah Worthington Parsons, Oakwood, Texas; Harvard University Medical School, Boston, 1880; National University Faculty of Medicine, Mexico City, 1898; aged 74; died, September 4, of chronic myocarditis.

William Scarff Wiley, Bristol, Va.; Baltimore Medical College, 1905; member of the Medical Society of Virginia; on the staff of the King's Mountain Memorial Hospital; aged 49; died, September 11, of tetanus.

Richard Augustus Verdier ✠ Corvallis, Ore.; Atlanta (Ga.) School of Medicine, 1908; member of the State Medical Association of Texas; aged 49; died, August 20, of septicemia following a mastoid operation.

James William Henderson ✠ Clarksdale, Miss.; Memphis (Tenn.) Hospital Medical College, 1902; on the staff of the Ancient Order of Watchmen Hospital; aged 54; died, September 10, of heart disease.

Thomas B. Johnson, Towanda, Pa.; Bellevue Hospital Medical College, New York, 1868; member of the Medical Society of the State of Pennsylvania; aged 87; died, July 8, of carcinoma of the liver.

Lorenzo Cantu ✠ Eagle Pass, Texas; School of Medicine of Nuevo Leon, Monterey, Mexico, 1886; aged 68; died, July 7, in a hospital at San Antonio, of septicemia due to an infection of the prostate.

Henry R. Spruance ✠ Wilmington, Del.; Jefferson Medical College of Philadelphia, 1892; aged 65; died, August 14, in the Jefferson Hospital, Philadelphia, of acute suppurative orchitis, myocarditis and uremia.

Charles Caldwell Park, Montecito, Calif.; Bellevue Hospital Medical College, New York, 1888; member of the California Medical Association; aged 70; died, August 14, of cerebral hemorrhage.

John Franklin May, Ashland, Ky.; Kentucky University Medical Department, Louisville, 1905; member of the West Virginia State Medical Association; aged 62; died, September 14, of heart disease.

John R. Cunning, Lonoke, Ark.; Kentucky School of Medicine, Louisville, 1894; member of the Arkansas Medical Society; health officer; aged 70; died, July 18, of mitral insufficiency and diverticulitis.

William J. Mabee, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1908; for many years on the staff of the Toronto General Hospital; aged 50; died, August 23, of heart disease.

Theodore Leacraft Hein ✠ New York; Columbia University College of Physicians and Surgeons, New York, 1905; served during the World War; aged 52; died, September 25, of heart disease.

William Thomas Morgan Gadsden, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1892; member of the Medical Society of the State of Alabama; aged 62; died, August 5.

Elwyn Stevens Coburn ✠ National City, Calif.; Medico-Chirurgical College of Philadelphia, 1895; part owner of the Elwyn Sanitarium; aged 66; died, August 26, of chronic myocarditis.

Bernhardt H. Baumeister, San Francisco; University of California Medical Department, 1882; aged 79; died, September 4, in St. Joseph's Hospital, of hypertrophy of the prostate.

Louis Ginsburg ✠ Toledo, Ohio; University of Pennsylvania School of Medicine, Philadelphia, 1918; on the staff of the Mercy Hospital; aged 41; died, September 25, of pneumonia.

George Edmund Mauk ✠ Clearfield, Pa.; Medico-Chirurgical College of Philadelphia, 1909; on the staff of the Clearfield Hospital; aged 47; died, August 27, of heart disease.

Philip Abram Smith, Milton, Pa.; Medical Department of the University of the City of New York, 1888; also a minister; aged 70; died, September 14, of chronic nephritis.

Frederick William Cordes ✠ Brooklyn; Albany Medical College, 1895; on the staff of the Bushwick Hospital; aged 60; died, September 8, in the Swedish Hospital.

Charles Landon Fletcher, Morris, N. Y.; University of Vermont College of Medicine, Burlington, 1873; formerly county coroner; aged 80; died, September 15.

John William Geiger, New Brookland, S. C.; Medical College of the State of South Carolina, Charleston, 1857; Civil War veteran; aged 99; died, August 24.

George Montgomery McMillan, Cordele, Ga.; Southern Medical College, Atlanta, 1883; also a druggist; formerly mayor of Cordele; aged 72; died, July 14.

James Squair Calder, Los Angeles; Harvard University Medical School, Boston, 1866; member of the California Medical Association; aged 90; died, August 27.

David C. Cline, Dumfries, Va.; Lincoln Memorial University Medical Department, Knoxville, 1911; aged 63; died, August 16, of cardiorenal vascular disease.

Joseph Hamilton ✠ Oakland, Calif.; Cooper Medical College, San Francisco, 1903; aged 56; on the staff of the Merritt Hospital, where he died, September 19.

Walter Howard Cowan ✠ Conneaut Lake, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1898; aged 63; died, September 26, of coronary thrombosis.

Edmund St. George Baldwin, Toronto, Ont., Canada; University of Edinburgh Faculty of Medicine, Edinburgh, Scotland, 1875; aged 80; died, August 31.

Herbert William Burgess, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1905; aged 60; died, July 15, in St. Michael's Hospital.

Milton Mallory Tucker, Orono, Ont., Canada; Victoria University Medical Department, Coburg, 1870; M.R.C.S., England, 1876; aged 81; died, July 20.

Wilfred Jerrold Taylor, Thompson, Conn.; Jefferson Medical College of Philadelphia, 1900; aged 54; died suddenly, August 23, of cerebral hemorrhage.

Samuel Luther McCreight, Oak Park, Ill.; Rush Medical College, Chicago, 1885; aged 82; died, September 27, of chronic myocarditis and arteriosclerosis.

William Herbert Black, Johnson City, N. Y.; University of Pennsylvania School of Medicine, Philadelphia, 1926; aged 32; was asphyxiated, July 30.

Joseph Morin, Quebec, Que., Canada; Laval University Faculty of Medicine, Quebec, 1904; died, August 3, in the Hospital du Saint Sacrement.

Winfield S. Brandon, Daleville, Ind.; Medical College of Indiana, Indianapolis, 1882; aged 79; died, August 17, in St. John's Hospital, Anderson.

Joseph Agate House, New York; Eclectic Medical College of the City of New York, 1880; aged 76; died, September 18, of angina pectoris.

Carlos Gabriel Armstrong ✠ New York; Columbia University College of Physicians and Surgeons, New York, 1920; aged 34; died, July 22.

Samuel Ewing Standrod, Rockcastle, Ky.; Vanderbilt University School of Medicine, Nashville, Tenn., 1886; aged 68; died suddenly, July 30.

Maurice B. Sincere, Chicago; Bellevue Hospital Medical College, New York, 1888; aged 64; died, July 15, of septicemia following a carbuncle.

Alfred Robb Bailey, Seattle; University of Nashville (Tenn.) Medical Department, 1888; aged 71; died, in September, of heart disease.

Theodore C. Wheaton, Millville, N. J.; University of Pennsylvania School of Medicine, Philadelphia, 1879; aged 79; died, September 8.

Park William Bushong ✠ Pittsburgh; Western Pennsylvania Medical College, Pittsburgh, 1903; aged 56; was drowned, in September.

David D. Fritch, Macungie, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1876; aged 83; died, in September.

Cornelius Larsen Lenard, Chicago; College of Physicians and Surgeons, Chicago, 1895; aged 64; died, September 24, of heart disease.

Bayard Kane, West Chester, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1899; aged 59; died, August 31.

Clark R. Campbell, Williamsburg, W. Va.; College of Physicians and Surgeons, Baltimore, 1885; aged 73; died, September 10.

Thomas R. Logan, Lewisburg, Tenn.; Vanderbilt University School of Medicine, Nashville, 1890; aged 67; died, August 28.

James Newman Fuller, Berwick, N. S., Canada; Bellevue Hospital Medical College, New York, 1868; aged 85; died, July 23.

Orville Curtis ✠ Buchanan, Mich.; Albany Medical College, 1893; aged 64; died, September 19, of cerebral hemorrhage.

Charles F. Negley, Henderson, Ky.; Louisville Medical College, 1902; aged 77; died, September 19, of thrombosis.

Bureau of Investigation

MISBRANDED "PATENT MEDICINES"

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

Anti-Phymin.—R. E. MacIntire and Company, Pensacola, Fla., shipped in June, 1929, into Alabama a quantity of Anti-Phymin that was declared misbranded. The preparation consisted of sulphur dioxide and water, the water being present to the extent of 99.81 per cent. The claim made for the preparation, that it was a "compound of essential atmospheric elements," was declared false and misleading, while the claim that it would effectively control bacterial fermentation in the body was declared false and fraudulent. In May, 1930, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17453; issued March, 1931.*]

[Anti-Phymin was dealt with at some length in this department of THE JOURNAL, August 15, 1925, at which time the analysis made by the A. M. A. Chemical Laboratory showed that this fraudulently exploited remedy belonged to the same class as "Liquozone," "Radam's Microbe Killer," "Septicide," etc. Since the issuance of the government report, abstracted above, on Anti-Phymin, the name Anti-Phymin seems to have been dropped and it is now known as Medicinal Gas. The concern that puts it out had, according to a letterhead sent out in July, 1931, one H. Michener, M.D., for its "Supervising Physician." Michener, in 1930, seems to have been in charge of a so-called Wichita Tuberculosis Laboratory at Wichita, Kans.]

Stanback Headache Powders.—The Stanback Medicine Company, Spencer, N. C., shipped into Georgia in January and February, 1929, a quantity of Stanback Headache Powders that were declared misbranded. Each powder contained over 2 grains of acetanilid, nearly 6 grains of aspirin, and more than 11½ grains of potassium bromide, together with caffeine. The product was declared adulterated, because the amount of acetanilid present was incorrectly stated on the label; it was declared misbranded, because the claims that it was a remedy for neuralgia, earache, toothache, rheumatic and female pains,

STANBACK
HEADACHE POWDERS
TRADE MARK
Each Powder Contains
2½ Grains Acetanilid
RELIABLE
AND
SPEEDY
REG.
U.S.
PAT. OFFICE
DIRECTIONS
For the Relief of Discomfort of Simple Headache and Neuralgia, also Muscular Aches and Pains, take one powder dry on the tongue followed with water, or mix with a little water. One Powder Usually gives the desired results. If necessary another may be taken in 30 minutes. For further directions see circular enclosed.
THESE POWDERS CONTAIN NO OPIUM, MORPHINE, CODEINE OR CHLORAL
MANUFACTURED BY
STANBACK MEDICINE COMPANY SPENCER N C

influenza, etc., were false and fraudulent. In May, 1929, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17460; issued March, 1931.*]

All Healing Ointment.—The Manhattan Drug Company, Brooklyn, N. Y., shipped in January, 1930, to South Carolina a quantity of All Healing Ointment that was declared misbranded. The preparation had a lanolin base, together with zinc oxide, boric acid, carbolic acid, sulphur, menthol and thymol. The claims that it was a remedy for boils, itch, ulcers, all skin diseases, etc., were declared false and fraudulent and in January, 1930, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17459; issued March, 1931.*]

Bromalina.—This preparation was being sold and offered for sale in February, 1930, in Porto Rico. When analyzed, it was found to consist essentially of creosote, a trace of bromoform, sugar, alcohol and water, flavored with oil of wintergreen. The claims that it was a remedy for influenza, cough, bronchitis, etc., were declared false and fraudulent, and in March, 1930, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17205; issued January, 1931.*]

B-C for Headache and Neuralgia.—The B. C. Remedy Company, Durham, N. C., shipped in January, 1929, into Georgia a quantity of B-C for Headache and Neuralgia that was misbranded. The product came in the form of powders, each containing over 6½ grains of aspirin, nearly 4 grains of acetanilid, and over 12 grains of potassium bromide. The statement on the trade package, that it was "absolutely safe," was declared false and misleading; the claims that it was a positive relief for neuralgia, sleeplessness, influenza, rheumatic and female pains, etc., were declared false and fraudulent. In May, 1929, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17469; issued March, 1931.*]

"B-C" Stops Headaches and Quiets Nerves

When one of those sick, raging headaches come, and you want relief in three minutes, go to your druggist and ask him for a package of "B-C," the wonderful new prescription of a North Carolina druggist that is guaranteed safe and speedy, with no depression or bad after effects.

"B-C" relieves any kind of a headache, sciatic or neuralgic pains, because it contains five ingredients that function together for the relief of pain, regardless of its origin. The "B-C" formula is one of the most important medical discoveries of recent years, accomplishing as it does, in a few minutes, what no other one-drug preparation can do under one to three hours.

Sold by all druggists in 10c and 25c packages.

--Adv

Rocky Mountain Cough and Catarrh Root.—The Colorado Cough and Catarrh Root Company of Denver shipped in February, 1930, into the State of Washington a quantity of Rocky Mountain Cough and Catarrh Root that was declared misbranded. The stuff was found to be the dried rhizomes and roots of a species of angelica. The claims on the trade package, that it was a remedy for cough and catarrh, bronchial asthma, rheumatism, consumption, indigestion, neuralgia, nervousness, general debility, and various other conditions, were declared false and fraudulent. In May, 1930, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17465; issued March, 1931.*]

Larkin Cold and Grippe Tablets.—The Larkin Company, Inc., Buffalo, N. Y., shipped between December, 1928, and February, 1929, a quantity of Larkin Cold and Grippe Tablets that were misbranded. The tablets contained acetanilid, quinine hydrobromide, monobromated camphor, caffeine and aloin. The claim that the product was a remedy for influenza, etc., was declared false and fraudulent; the statement that the tablets were absolutely safe was declared false and misleading. In March, 1930, the Larkin Company of Illinois appeared as claimant, and judgment of condemnation and forfeiture was entered. The court ordered that the product be released to the Larkin Company of Illinois upon payment of costs and the

execution of a bond of $300, conditioned in part that it be relabeled truthfully.—[*Notice of Judgment 17473; issued March, 1931.*]

Watkins Menthol-Camphor Ointment.—The J. R. Watkins Company of Newark, N. J., shipped between September and December, 1929, into California a quantity of Watkins Menthol-Camphor Ointment that was declared misbranded. The product was, essentially, petrolatum containing camphor and menthol. The claim that it was a remedy for influenza, spasmodic croup, neuralgia, etc., was declared false and fraudulent, and in May, 1930, the J. R. Watkins Company of Winona, Minn., admitted the allegations. Judgment of condemnation and forfeiture was entered and the court ordered that the product be released to the Watkins concern under a bond of $3,000 and the payment of costs, on condition that it be relabeled and repacked to conform to the law.—[*Notice of Judgment 17467; issued March, 1931.*]

Neuraline Tablets.—The Eureka Medical Company of South Bend, Ind., shipped in December, 1928, into Missouri a quantity of Neuraline that was declared misbranded. Neuraline Tablets were found to contain 2½ grains of acetanilid to each tablet and milk sugar. The claims that it was a remedy for neuralgia, influenza, rheumatic pains, painful menses, tonsillitis, etc., were declared false and fraudulent. In May, 1930, the court ordered that the product be destroyed.—[*Notice of Judgment 17470; issued March, 1931.*]

Baker's Laxative Cold and Grippe Tablets.—The Manhattan Drug Company, Brooklyn, N. Y., shipped in July, 1929, into Michigan a quantity of Baker's Laxative Cold and Grippe Tablets that were misbranded. The tablets contained acetanilid, aloes and traces of cinchonine and red pepper. The claims on the trade package, that it was a remedy for influenza, coughs, neuralgia, bronchitis, etc., were declared false and fraudulent, and in February, 1930, judgment of condemnation and forfeiture was entered and the court ordered that the product be destroyed.—[*Notice of Judgment 17206; issued January, 1931.*]

Correspondence

"TRANSMISSION OF TUBERCULOSIS"

To the Editor:—In THE JOURNAL, August 1, page 316, Dr. J. A. Myers offers a pathetic picture which may create unrest in the minds of prospective medical students and tuberculosis nurses as well.

The teaching of tuberculosis as a clinical entity in medical schools had its inception about twenty years ago. Previous to that time tuberculosis was not considered of sufficient importance to be offered space in the curriculum of any medical school in our country. I can well recall my first attempt at the organization of a class for the teaching of clinical tuberculosis. At that time all medical students considered the examination of an active tuberculous person as extremely hazardous, and it was not until many years later, when the student body became convinced that there was actually no danger in the physical examination of the tuberculous patient, that classes became enrolled for intensive study of tuberculosis at the bedside. Gradually as the students overcame their inborn fear my classes began to grow in number. When I gave my last and final class on tuberculosis at Rush, the Medical Department of the University of Chicago, in 1927, I had an enrolment of seventy students, and four members of the class were women. All were junior and senior students. As to Dr. Myers' carefully written paper, I am quite confident that if it or a similar paper had been circularized among the many students whom I have taught their first principle in physical diagnosis and subsequently tuberculosis I would not have been able to organize a single class—all out of an unwarranted fear that contact with a tuberculous individual would bring about infection and later disease. We know today that even under ordinary precautions alone there is no danger of becoming either infected or diseased.

It is hardly conceivable that with even ordinary care a medical student examining an active tuberculous individual, or a probationary nurse taking care of or nursing an active tuberculous person, should in so limited a time show all the symptoms of active tuberculosis, from a nontuberculous person in so short a time become an adolescent tuberculous person.

A student's tuberculin test, January 15, was negative to a milligram, a negative Mantoux, but after ten days' service with an active tuberculous person was found positive on April 21, three months later, and a nurse in September, 1930, was Mantoux negative, but on taking care of a desperately sick tuberculous patient was not only infected in November, 1930, also after three months, but tuberculously diseased as well. This may all happen, but it must be extremely infrequent. The histories of the seven patients—both students and nurses—all give a similar picture after active tuberculosis service; hence one must assume that all must have had a massive implantation of tubercle bacilli; also the percentage of pleurisies with effusion, which usually is evidence of active tuberculosis, is much higher than is generally found in the routine examinations of suspected tuberculous persons. Four patients out of seven, judging from the case histories, had this complication: 57 per cent, unusually high. The classic observations of Professor Saugmann of Denmark, some years ago, covering a period of ten years, and the surveys made at several sanatoriums in our own country all show that, in the relationship of the interns, attendants and nurses in the care and treatment of the tuberculous at tuberculosis sanatoriums the incidence of tuberculous infection and disease is very infrequent. I believe that this able paper presented by Dr. Myers offers too gloomy a picture to the prospective medical student, the probationary nurse and the hospital nurse.

JOHN RITTER, M.D., Miami, Fla.

[NOTE.—Dr. Ritter's letter was referred to Dr. Myers, who replies:]

To the Editor:—The points to which Dr. Ritter takes exception seem to be (1) that such facts will frighten students and (2) that tuberculosis is not communicable.

The situation which Dr. Ritter refers to was true years ago because tuberculosis was considered incurable at that time and hence the fear which the public had was an unreasoning one. Since this situation no longer exists, the possibility of a reversion to such a fear is unfounded. My experience with students of nursing and medicine has taught me that they are not cowardly groups; that most of them appreciate the health hazards of the nurse and the physician in school and in practice. Most of them know of numerous fatalities which have occurred among members of their professions from communicable diseases. They are confident of the fact that the school of nursing or the school of medicine of today will provide every known method of protection against smallpox, diphtheria, typhoid, scarlet fever, and the other diseases commonly found in a contagious service. They have so much confidence that their faculties and hospital authorities will provide this protection that they have little or no fear of the diseases. Moreover, they look on this as an opportunity to learn how to protect themselves against the disease when they enter on the practice of their professions. They also have a hope of being able to pass on what they have learned by way of prevention to others. If, however, it became noised about that a certain hospital was not providing the essential protection against contagious diseases and that from 5 to 12 per cent of the students who entered that service fell ill and several died every year, most certainly the students would be justified in shunning that service.

It is a well established fact that the morbidity from tuberculosis among students of medicine and nursing and recent graduates of these schools is greater than among young men and young women of the general population, and it is possible

to trace infection and disease with laboratory accuracy from the tuberculous patient to the student who was previously uninfected. Dr. Ritter states that it is hardly conceivable that even with ordinary care a medical student or a student nurse should in so limited a time show all the symptoms of active tuberculosis. In the seven cases reported, it is my opinion that their lesions represent the first infection or childhood type of tuberculosis. Four of them developed pleurisy with effusion, which I interpret as an allergic reaction. Dr. Ritter is of the opinion that each of the seven students had a massive implantation of tubercle bacilli. Possibly this is true, but is it not a disparaging reflection on the nursing and medical schools of this country to allow this to occur?

Although opinion has been to the contrary, investigations show that many hospitals and schools of nursing and medicine are spreading tubercle bacilli to the uninfected students. These bacilli reap their harvest in the clinical years of student life and in the early years of practice.

I am firmly convinced that the students of these professions are not cowards but that they will continue to enter these professional schools and that they should demand and will demand the same protection that is now provided them against other communicable diseases.

J. ARTHUR MYERS, M.D., Minneapolis.

"'PANAGGLUTINABLE' ERYTHROCYTES"

To the Editor:—I read with considerable interest your editorial on "'Panagglutinable' Erythrocytes" (THE JOURNAL, August 1, p. 323). Recently, in the examination of several specimens of menstrual blood, it was found that suspensions of the red blood corpuscles were agglutinated by serums of all four blood groups in nearly every case. In one case in which this did not occur, the menstrual blood was reexamined after having been kept in the icebox for two weeks and then was found to be markedly panagglutinable. The significance of this observation is that the vagina contains one or several organisms that can produce the Thomsen phenomenon.

ALEXANDER S. WIENER, M.D., Brooklyn.

DEHYDRATION AND ANURIA

To the Editor:—I noticed with interest an article in THE JOURNAL, August 22, by Drs. Root and Henson giving in detail the history of a case of appendicitis which postoperatively was followed by vomiting and anuria or retention. The patient was evidently relieved by the injection of 60 cc. of a 10 per cent solution of sodium chloride intravenously in the short period of four hours. The cause of the condition they assume to be a lowered blood chloride content, which in this case by actual measurement was 248 mg., caused by the vomiting. To me the lowered chloride content appears extremely doubtful as the cause of the anuria, which can be much more readily explained on the dehydration produced by the vomiting, especially since the injection of 1,650 cc. of physiologic solution of sodium chloride given previously by hypodermoclysis failed to relieve the condition. In this case the administration of dextrose probably did more to relieve the condition by stopping vomiting than did the simple injection of the concentrated chloride solution.

BENJAMIN POLLACK, M.D., Willard, N. Y.

[NOTE.—The letter was referred to Dr. Root, who replies:]

To the Editor:—With regard to Dr. Pollack's contention that dehydration was the cause of anuria, it should be remembered that the child had received and retained not only 1,650 cc. saline solution under the skin but also 4,680 cc. tap water by rectum. Furthermore, his tongue was moist and he appeared edematous rather than dehydrated. Also, he did not stop vomiting after he was given dextrose solution. The low plasma chloride is still unexplained.

HOWARD F. ROOT, M.D., Boston.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

USE OF CONVALESCENT SERUM IN POLIOMYELITIS

To the Editor:—Can you give me the technic for handling poliomyelitis serum for therapeutic purposes, from donor to patient; i. e., quantity withdrawn at one time, preservatives, duration of potency and dosage?

HENRY STEWART, M.D., Gettysburg, Pa.

ANSWER.—The blood is withdrawn under sterile precautions by means of a special apparatus into a centrifuge flask. The flask has a two-hole stopper with glass and rubber tubes attached, such as is usually used for collecting fluids aseptically. After coagulation has occurred the serum is drawn off and centifugated. Wassermann and sterility tests are performed on the serum.

The amount drawn varies with the age, size and condition of the donor and may be from 150 to 400 cc. Tricresol is used as a preservative; equal parts of ether and tricresol are added so that there is a final concentration of 0.2 per cent tricresol, or 0.4 per cent of the mixture of ether and tricresol. It is generally agreed that the potency of the serum is not appreciably diminished over a period of one year, when kept at 4 C. There is a variance of opinion as to dosage, but it is generally agreed that the first dose in a case is 20 cc. of serum intraspinally and 60 cc. intravenously, and, if a second or third administration is necessary, each dose is 20 cc. intraspinally. Additional treatment depends on the course and progress of the case.

USE OF METAPHEN

To the Editor:—What strength metaphen is suitable as a local treatment to the cervix and other parts in gonorrhea? Is metaphen suitable for this? Please omit name.

M.D., Indiana.

ANSWER.—Metaphen is a germicide which contains from 58 to 60 per cent of mercury in organic combination and is said to be so powerful that it inhibits the growth of staphylococci in a dilution as high as 1:20,000,000. It is relatively nonirritating when applied to mucous membranes or the skin. Hence it should likewise exert no deleterious effect on the cervix. Local applications of metaphen have been advocated for the treatment of gonorrhea, for infections of the eyes, for disinfection of the skin and for sterilization of instruments and rubber. The solution recommended for urethral irrigations varies from 1:5,000 to 1:10,000 and for application to the skin from 1:500 to 1:2,500. A solution varying from 1:500 to 1:1,000 may safely be applied to the cervix in cases of gonorrhea. As far as is known there has been no report on the use of metaphen for gonorrheal cervicitis.

HEART DISEASE FOLLOWING BLOW OVER STERNUM

To the Editor:—Is there any evidence that a blow on the sternum or over the heart can cause (1) auricular fibrillation, (2) pericarditis, (3) fever? In the case in point a woman, aged about 40, received a blow on the chest from the steering wheel of her automobile in an accident. There were no visible signs of contusion and no fracture of the ribs or sternum. The woman says she was perfectly well before the accident and insists on a causal relationship between the trauma and her present condition. Please omit name.

M.D., California.

ANSWER.—1. No record has been found of a case in which a blow on the sternum or over the heart is shown to have caused auricular fibrillation. Such a blow, however, may well cause a disturbance of the cardiac rhythm of longer or shorter duration.

2. A blow over the pericardium may result in pericarditis. Such a case, following an automobile accident in which the victim was thrown violently forward against the steering wheel, was reported in *Minnesota Medicine* **9**:453 (Aug.) 1926.

3. After such an injury, if pericarditis occurs, a rise of temperature may be expected. Such a rise of temperature may possibly be due, too, to other results of the injury. In any case, the frequency with which disorders of the heart exist without the knowledge of the person whose heart is disordered, and are discovered only in the course of medical examinations made in connection with applications for insurance or after accidents,

compels caution in attributing such a disorder to trauma when it is discovered after an accident. In any case such as that described, the subjective visceral symptoms may be the result of a lowering of the threshold of consciousness due to nervous shock, plus wishful thinking, entirely apart from any intention of deception on the part of the patient.

REMOVAL OF RETAINED ROOTS OF TEETH

To the Editor:—I have a patient showing symptoms of focal infection. Roentgenograms of the teeth show about one-half inch of apex of a root remaining in the lower jaw where a wisdom tooth was extracted about five years ago. The plate shows no rarefaction of bone, no pus pockets or granuloma. Will the fragment of tooth remaining, in the absence of any definite infected area, cause sufficient bacterial invasion to produce symptoms of focal infection? I might add that there is no local tenderness or soreness. I would appreciate a bibliographic reference also.

E. J. Reichley, M.D., Herington, Kan.

Answer.—If there are no other regions in the mouth or elsewhere that are at all suggestive of infection and, therefore, of being a primary focus, this condition in the socket of a lower wisdom tooth deserves careful attention. The absence of local symptoms is of no material importance. The bone plates on both sides of this socket are so thick as to interfere with the penetration of the roentgen rays, so that a moderate degree of bone resorption may not be recorded on the negative. Films exposed at a number of different angles are often of value in solving such a problem; the film may be held between the teeth, well back, and exposed with the tube aimed at the lower border of the mandible near the angle.

One hesitates to advise the removal of this root without some positive evidence as to its involvement, because of the technical difficulties of the operation resulting from inaccessibility and the presumed density of the bone about this root. Hence it should be attempted only as a last resort or after eliciting definite evidence of disease.

The histology of retained roots has been carefully described by Gottlieb and his co-workers (Kotangi: Histologische Befunde an retinierten Zähnen, *Ztschr. f. Stomatologie*, 1924). Many of them are without evidence of infection and in some instances are joined to the bone.

CLIMATE AND REST FOR SINUS INFECTION AND CARDITIS

To the Editor:—A boy, aged 7, for the last two or three years has had a postnasal infection. Roentgen examination reveals thickening of the antral linings, involvement of the ethmoids, and the like. He has had many attacks of acute otitis media. Last winter he developed an acute mastoiditis (for which operation was performed), during which he had an acute endocarditis; this has left his heart with some muscular impairment—the pulse rate is constantly over 100. The boy's parents wish to take him to Arizona this year for the winter, hoping that his postnasal infection may be benefited. They wish to go either to Tucson or Phoenix. Which would be most beneficial to his nasal condition, which less detrimental to his heart condition? As I understand it, the altitude of Tucson is much greater than that of Phoenix, while the air at Phoenix is much more moist than that around Tucson. Please omit name.

M.D., Indiana.

Answer.—The dryer climate would certainly be more advantageous for the postnasal infection. The altitude of Tucson is only 2,286 feet, which is hardly enough to be especially detrimental to his heart. However, if there is any question, other places may be found where the altitude is even less and where it is at least equally dry, as Palm Springs, Calif., and there are doubtless many other such locations. If there is the least evidence of the carditis being still active, as indicated by an elevation of the temperature above normal, he should be kept at absolute rest wherever he is.

OOPHORECTOMY AND LIBIDO

To the Editor:—I have a patient who had a bilateral salpingectomy and oophorectomy ten years ago. Since then she has lost all sexual desire, has gained 20 pounds and has lost the energy she once had. It was my understanding that removal of the ovaries had no effect on sexual desire. Am I right? Could the changes here be due to a disturbance in some of the other internal glands of secretion? What should I advise her about treatment? Please omit name. M.D., Texas.

Answer.—In most instances in which castration is produced either by bilateral oophorectomy or by radiation therapy, sexual desire remains undisturbed. Libido is also retained in most women who have passed the natural menopause and in whom presumably all ovarian activity has ceased. On the other hand, patients with nymphomania or pathologically increased sex desire are not benefited by bilateral oophorectomy. In spite of all this, the sex urge does diminish or disappear in a certain proportion of women who are castrated artificially. How much of this is due to the physical removal of the ovaries is difficult to say, but there is undoubtedly a large psychic factor. The public, male as well as female, is of the opinion that removal of the ovaries "unsexes" a woman and that therefore any sex desire she may have is lost after such an operation. Furthermore, many lay individuals believe that any operation for the purpose of producing sterilization, even if it consists only of ligation of the fallopian tubes, also brings about the loss of libido. These beliefs undoubtedly play a part in some of the cases in which sex desire is lost after operation.

Removal of both ovaries before the natural menopause has an effect on at least some of the other glands of internal secretion, especially the pituitary, but most likely these effects have nothing to do with the loss of sex desire. Treatment directed toward the restoration of libido is not simple. Drugs are almost entirely useless except when they are employed to tone up the patient's general condition. Since there is a large psychic factor in these cases, a sympathetic and tactful discussion with the patient may help.

FRACTURE INTO INTERNAL EAR

To the Editor:—A man, aged 65, fell about 20 feet, fracturing the petrous portion of the right temporal bone, the fracture extending up on the squamous portion, with rupture of the tympanum, with at the same time a fairly long laceration in the external canal which was independent of the tear in the drum. He was unconscious for about half an hour and semiconscious for about twenty-four hours. Extreme dizziness and vertigo, with tinnitus, have persisted and sudden movements aggravate these symptoms. He has a positive Romberg test, falling always to the left. There is slight arteriosclerosis, but not to a degree that would be expected to cause these symptoms, and in view of the fact he had never been troubled in the past, it would seem probable that the fracture is responsible. Can you give me any idea as to the probable duration of these symptoms, and also whether any line of treatment other than rest is indicated? Please omit name and address. M.D., Florida.

Answer.—The symptoms reported are those which result from any sudden destruction of the internal ear, such as a fracture through the petrous portion of the temporal bone. The inquirer fails to mention, however, the fact that the patient is totally deaf in the affected ear.

The fracture was on the right side and the patient has a positive Romberg sign which causes him to fall to the left. This is not in keeping with the usual clinical picture of a sudden destruction of the right ear. The tonus impulses from the right ear stimulate the muscles which produce movements to the left, and the tonus impulses from the left ear stimulate the muscles causing movement to the right. Disturbances of equilibrium that arise from the sudden destruction of one labyrinth are back of the unbalance occasioned by the sudden suppression of the tonus from this ear. If the right ear is destroyed and its tonus suppressed, the impulses from the left ear should cause the patient to fall to the right.

As regards the duration of the symptoms resulting from a fracture through the petrous bone: The destruction of the hearing function is permanent. The tinnitus may persist indefinitely but usually subsides to a point at which it causes little annoyance to a patient after a few months. The most annoying symptom of all, the intense vertigo, is of only short duration and practically disappears before the lapse of a month or two.

INCREASED ALTITUDE AND HEART DISEASE

To the Editor:—I have a woman patient, aged 50, who has nephritis with albumin and casts in the urine. Her blood pressure is 200 systolic and 110 diastolic, and decided evidence of decompensation of the heart is apparent. When up and around there is much edema of the feet and legs, which disappears after several weeks in bed. She is orthopneic and dyspneic. With an elevation here of about 1,400 feet, what possibilities would there be of her being able to go to the state of Washington? She proposes going by way of the Great Northern Railroad, which is supposed to have a tunnel which cuts down the necessity of such great elevation. Please omit name. M.D., North Dakota.

Answer.—The patient would do much better to remain at a low altitude. If she is going to a low altitude in Washington it is probable that she could make the trip safely, but there is a certain element of danger, which must be weighed and carefully balanced against the ability of the patient's heart to respond to increased demands. The route chosen hardly gets above 4,000 feet and is above 2,000 feet for less than twenty-four hours and above 3,000 feet for only about eight hours.

The decrease in oxygen tension with increased altitude must be compensated for by an increase in the depth and rate of

respiration to increase the minute volume of air respired, by an increase in the minute volume of blood pumped by the heart, and in some part by an increase in the number of red cells, to increase the oxygen carrying power of the blood.

There is not much change in respiratory rate in normal people below 5,000 feet, and the pulse rate rarely shows much change below 5,000 feet, and in one group of normal men only 1 per cent showed any change at 7,000 feet.

It is a question of whether the patient's condition warrants subjecting her to the fatigue and excitement of a railway journey, plus a moderate increase in the work of the heart demanded by an increased altitude. The margin of safety and the ability of the heart to respond must be judged at the bedside. Certainly many patients do become worse under the conditions stated.

UNUSUAL OBSTETRIC CONDITION

To the Editor:—Mrs. R. O., a primipara, last menstruated, Oct. 3, 1916. The first week of February, 1917, she passed a clot half the size of a fist. I did not see her at that time but in consulting me afterward she said that she tried to disintegrate the clot but could not. I told her that she probably had an abortion. July 18, 1917, she gave birth to a full term baby girl as a breech presentation. Soon after its birth she began to have pains again. On examination I found the bag of waters protruding; it soon ruptured with a profuse rush of water. The placenta was delivered normally. I do not know whether this case is unique or otherwise: abortion at the end of the third month and five and one-half months afterward a full term baby with separate bags of water and one placenta. If this is worth publishing, I would like you to give an explanation.

R. L. GREER, M.D., Oakfield, Tenn.

ANSWER.—The description of the case is not clear. The statement is made that, after the full term baby was delivered as a breech presentation, a bag of waters protruded and ruptured with the escape of a large amount of water. It is important to know whether anything else escaped. It is hard to conceive that there existed a large bag of waters with nothing in it except liquor amnii. In a pregnancy, whether single or multiple, when the fetus escapes, the membranes, which of course had to rupture to permit the escape of the child, collapse and no more fluid can accumulate. It may be that the large clot which the patient expelled in February did not contain a fetus but simply represented a hemorrhage in a case of single pregnancy. Cases have been reported in which one fetus of twins or triplets was expelled during the early months of pregnancy and the remaining fetus or fetuses continued to develop until full term. These are usually cases of double ovum twins or triplets with two placentas. Usually, however, when one of two or three fetuses dies in utero it is retained in the uterus until full term. During labor it is expelled as a flat, mummified fetus known as a fetus compressus or a fetus papyraceus.

SODIUM CITRATE MIXTURE—MORPHINE FOR INJECTION—STERILIZING PROCAINE

To the Editor:—I would like some information about the following points: 1. I would like to use an aqueous solution of sodium citrate of about 25 per cent as an alkalizing agent. What can be used as a vehicle to render the salty taste less unpleasant? 2. Is morphine stable in aqueous solution in a strength of about one-fourth grain per cubic centimeter? Is it stable in the same strength in 25 to 50 per cent magnesium sulphate? 3. Can these solutions be sterilized in an autoclave? Will magnesium sulphate in this strength have any preservative action? 4. Can procaine solutions be autoclaved? Won't this destroy the epinephrine in such solutions? Please omit name. M.D., Indiana.

ANSWER.—1. The disagreeable taste of the sodium citrate solution can be lessened by giving it in more dilute solution, and especially by using it in the form of an effervescent salt.

2. One-fourth grain of morphine is not soluble in 1 cc. of water; hence morphine sulphate or hydrochloride should be used. Such solutions are relatively stable but decompose after a time and should not be used when any deposit occurs in the solution. Aqueous solution of morphine sulphate or hydrochloride kept in soft glass will deposit morphine in time, owing to alkali dissolved out of the glass.

3. Magnesium sulphate probably has no influence on the keeping properties of morphine dissolved in it; the solution can be sterilized in an autoclave without decomposition of the morphine.

4. Procaine (hydrochloride) may be heated with proper care in suitable containers in the absence of any trace of alkali. Epinephrine is even more sensitive to alkalis, but the solution of procaine with epinephrine may be sterilized with suitable precaution. It must not be heated for more than a few minutes and should be used at once after sterilizing.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Written examination for Group III candidates to be held in eighteen cities in the United States and Canada, Oct. 31. *Clinical examination for all candidates.* Chicago, Dec. 29. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

ARKANSAS: *Basic Science.* Little Rock, Nov. 2. Sec., Mr. Louis E. Gebauer, 1002 Donaghey Bldg., Little Rock. *Regular.* Little Rock, Nov. 10-11. Sec., Dr. Sam J. Allbright, Searcy. *Eclectic.* Little Rock, Nov. 10. Sec., Dr. Claude E. Laws, 803½ Garrison Ave., Fort Smith. *Homeopathic.* Eureka Springs, Nov. 10. Sec., Dr. Allison A. Pringle, Eureka Springs.

CONNECTICUT: *Regular.* Hartford, Nov. 10-11. *Endorsement.* Hartford, Nov. 24. Sec., Dr. Thomas P. Murdock, 147 West Main St., Meriden. *Homeopathic.* New Haven, Nov. 10. Sec., Dr. Edwin C. M. Hall, 82 Grand Ave., New Haven.

DELAWARE: *Regular and Homeopathic.* Wilmington, Dec. 8-10. Sec., Dr. Harold Springer, 1013 Washington St., Wilmington.

FLORIDA: Jacksonville, Nov. 23-24. Sec., Dr. Wm. M. Rowlett, 812 Citizens Bank Bldg., Tampa.

KANSAS: Kansas City, Dec. 8. Sec., Dr. C. H. Ewing, Larned.

KENTUCKY: Louisville, Dec. 1-3. Sec., Dr. A. T. McCormack, 532 West Main St., Louisville.

MAINE: Portland, Nov. 12-13. Sec., Dr. Adam P. Leighton, Jr., 192 State St., Portland.

MARYLAND: Baltimore, Dec. 8-11. Sec., Dr. Henry M. Fitzhugh, 1211 Cathedral St., Baltimore.

MASSACHUSETTS: Boston, Nov. 12-14. Sec., Dr. Stephen Rushmore, 144 State House, Boston.

NEBRASKA: Lincoln, Nov. 23-24. Act. Sec., Mr. P. H. Bartholomew, Lincoln.

NEVADA: Carson City, Nov. 2-4. Sec., Dr. Edward E. Hamer, Carson City.

NORTH CAROLINA: *Endorsement.* Raleigh, Dec. 7. Sec., Dr. John W. MacConnell, Davidson.

OHIO: Columbus, Dec. 8-10. Sec., Dr. H. M. Platter, 85 E. Gay St., Columbus.

SOUTH CAROLINA: Columbia, Nov. 10. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

TEXAS: Fort Worth, Nov. 17-19. Sec., Dr. T. J. Crowe, 918-19 Mercantile Bank Bldg., Dallas.

UTAH: Salt Lake City, Dec. 1-2. Dir., Mr. S. W. Golding, 412 State Capitol Building, Salt Lake City.

VIRGINIA: Richmond, Dec. 8. Sec., Dr. J. W. Preston, 720 Shenandoah Life Bldg., Roanoke.

WEST VIRGINIA: Morgantown, Nov. 19-21. Sec., Dr. W. T. Henshaw, Charleston.

Maine July Report

Dr. Adam P. Leighton, Jr., secretary, Maine Board of Registration of Medicine, reports the written examination held at Augusta, July 7-8, 1931. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Fourteen candidates were examined, all of whom passed. Three physicians were licensed by reciprocity with other states, and one by the endorsement of credentials. The following colleges were represented:

PASSED		Year Grad.	Per Cent
Boston University Medical School	(1928)	82, (1930)	83, 88
Harvard University Medical School	(1925)	88, (1927)	87
Tufts College Medical School	(1911)	81, (1930) 91, (1931)	82, 85
Columbia University College of Phys. and Surgs	(1925)		85
University of Rochester School of Medicine	(1931)		93
Jefferson Medical College of Philadelphia	(1930)		88
University of Vermont College of Medicine	(1905)		78
McGill University Faculty of Medicine	(1931)		88

LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Maryland Medical College	(1900)	New Hamp.
Jefferson Medical College of Philadelphia	(1926)	Penna.
Baylor University College of Medicine	(1924)	Texas

ENDORSEMENT OF CREDENTIALS	Year Grad.	Endorsement of
Harvard University Medical School	(1926)	N. B. M. Ex.

New Mexico April Report

Dr. P. G. Cornish, Jr., secretary, New Mexico Board of Medical Examiners, reports 14 physicians licenced by reciprocity with other states and one by the endorsement of credentials at a meeting held in Santa Fe, April 13, 1931. The following colleges were represented:

LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Colorado School of Medicine	(1930)	Colorado
Emory University School of Medicine	(1921)	Georgia
Southern Medical College, Georgia	(1895)	Texas
Iowa Medical College, Eclectic	(1884)	Iowa
University of Louisville Medical Department	(1892)	Colorado
University of Nebraska College of Medicine	(1928)	Arizona

Columbia University College of Phys. and Surgs.	(1920)	Connecticut
Western Reserve University Medical Department	(1912)	Ohio
Baylor University College of Medicine	(1926), (1929)	Texas
University of Texas School of Medicine	(1929)	Texas
Medical College of Virginia	(1922)	New York
Licentiate of the Royal College of Physicians, London, and the Royal College of Surgeons, England	(1917)	Ohio
University of Berlin Faculty of Medicine	(1914)	Maine *

ENDORSEMENT OF CREDENTIALS

College	Year Grad.	Endorsement of
University of Illinois College of Medicine	(1926)	N. B. M. Ex.

* Verification of graduation in process.

Hawaii July Examination

Dr. James A. Morgan, secretary, Hawaii Board of Medical Examiners, reports the written examination held at Honolulu, July 13-16, 1931. The examination covered 10 subjects and included 55 questions. An average of 75 per cent was required to pass. Eight candidates were examined, all of whom passed. The following colleges were represented:

PASSED

College	Year Grad.	Per Cent
College of Medical Evangelists	(1931)	82.8
George Washington University Medical School	(1928)	81.4
Loyola University School of Medicine	(1931)	80.8
Northwestern University Medical School	(1925)	81.2
Indiana University School of Medicine	(1929)	83.3
University of Maryland School of Medicine and College of Physicians and Surgeons	(1929)	76.3
St. Louis University School of Medicine	(1931)	78.9
Jefferson Medical College of Philadelphia	(1929)	80.1

Connecticut Homeopathic Report

Dr. Edwin C. M. Hall, secretary, Connecticut Homeopathic Medical Examining Board, reports one physician licensed without examination, May 25, 1931, by special provision of the medical practice act, and one physician licensed by examination at a meeting held July 14, 1931. The following colleges were represented:

PASSED

College	Year Grad.	Per Cent
New York Homeopathic Medical College and Hospital	(1888)	
Hahnemann Med. College and Hospital of Philadelphia	(1929)	81.5

Book Notices

A STUDY OF HAIRS AND WOOLS BELONGING TO THE MAMMALIAN GROUP OF ANIMALS, INCLUDING A SPECIAL STUDY OF HUMAN HAIR, CONSIDERED FROM THE MEDICO-LEGAL ASPECT. By John Glaister, Jun., D.Sc., M.D., J. P., Professor of Forensic Medicine, the Medical Faculty, the University of Egypt, Cairo. Publication No. 2. Egyptian University, Faculty of Medicine. Cloth. Pp. 187, with 145 plates. Cairo: Misr Press, 1931.

Until the appearance of this book there was no monograph in the English language which attempted to present the information concerning animal and human hairs with any degree of completeness. Glaister essays to cover the field with a fair degree of success. However, the book leaves much to be desired in organization of material, in completeness and particularly in the quality of the photomicrographs, on which the author depends so much for the illustration of structural details so necessary for the classification and identification of hairs. The author has undoubtedly carried out a great deal of excellent independent research on the structure of hairs of some 150 mammalian species. The material presented apparently represents the results of these studies. It is unfortunate that the author was not familiar with the more recent literature on hairs and textile fibers, for he undoubtedly would have been able to profit by the experiences of Hausmann and other recent workers in improving his own technic. In a bibliography on the subject covering twenty-seven separate papers or books, only two are more recent than 1915.

The organization of the material is ideal for a study of zoological relationships, but cumbersome for consultation in its medicolegal aspects. One is compelled to search through several different sections in order to assemble the information concerning the hair of any one species. The list of animals selected for study is unusually complete. The hairs of many inaccessible animals are described here for the first time. From a practical standpoint, it would have seemed more desirable to pay less attention to such animals as the duck-billed platypus, spiny ant-eater and three-toed sloth in order to devote more space to the more common domestic animals, such as the dog and the goat. The author makes repeated references to hairs and wools as two separate classes but does not adequately explain the basis for his differentiation. The diameter of hairs is not considered to be significant in identification and all hairs are classified into three general groups: bristles, wiry hairs and soft hairs. When the author does speak of hair diameter, he uses unusual terminology; for example, the hairs of the elephant's tail (page 32) are said to be "⅕ cmm. in breadth and 1/10 cmm. in thickness."

The chief fault of the book is the poor quality of the photomicrographic plates, of which there are 110 representing animal hairs and 35 representing human hair. The author (pages 12 and 49) apologizes for the lack of detail in the plates but states that in spite of the apparently poor definition obtained in the photomicrographs they nevertheless showed just as much detail as could be discerned with the microscope. Sometimes the plates are so poor as to fail to disclose structural relationships which are described in detail in the text and said to be demonstrated by that particular photomicrograph (as on page 51 and plate 2). At least half of the 145 plates might have been omitted because of their poor quality. Without the plates the entire presentation could be well condensed into a much smaller space, as the author has already done in his excellent chapter on hairs in "Recent Advances in Forensic Medicine" (Smith and Glaister, 1931), pages 76-98. In spite of its shortcomings, the book is a distinct addition to the scientific literature on the subject of hair.

DIE HISTOGENESE EKTO-MESO-DERMALER MISCHGESCHWÜLSTE DER MUNDHÖHLE. Ein Beitrag zur Frage der Organisatorenwirkung (Spemann) beim pathologischen Wachstum. Von Prof. Dr. Paul Schürmann, Dr. med. Hans Pflüger und Zahnarzt Dr. Wilhelm Norrenbrock. Paper. Price, 11.50 marks. Pp. 94, with 79 illustrations. Leipzig: Georg Thieme, 1931.

This monograph consists of two discussions: one concerning the origin and relationship of tumors of the tooth forming tissues and tumors of the hypophysis, and a second, having to do with the genesis of the mixed cell tumor of the parotid. In both instances the literature is carefully reviewed, new cases are described and the subject is discussed critically. Two cases of tumors of the hypophysis are presented in which teeth or tooth-like structures were found; the tooth forms pictured resemble those found in compound odontomes and the authors did not find similar instances in the literature reviewed. Eleven cases of mixed cell tumors of the parotid are described in great detail. The authors conclude that the tumors embraced in their discussion arise from ectoderm rather than mesoderm, that squamous cells in the epithelial strands passing from the mouth epithelium to the tooth follicle develop into such various forms of mouth tumors as adamantinoma, odontoma and mixed cell tumor, that the hypophysis tumor in a similar fashion arises from squamous epithelial cells in the embryonic stem of the hypophysis starting from the roof of the mouth, and that, in the mixed cell tumor of the parotid, epithelium is the dominant component and its origin therefore single. Whether or not these conclusions are accepted by the reader, a careful study of this brief report is imperative for those who have any interest in tumors of the mouth or of the hypophysis.

OBSTRUCTIVE JAUNDICE: PHYSIOLOGIC AND SURGICAL ASPECTS. By Waltman Walters, M.D., F.A.C.S., M.S. in Surgery, Head of a Section in the Division of Surgery, the Mayo Clinic, Rochester. Paper. Pp. 132, with 44 illustrations. Rochester: Mayo Foundation, [n. d.].

When a surgeon is confronted with a case of obstructive jaundice he has on his hands a disease the surgical relief of which is accompanied by great hazard. The first chapter of this book is experimental and is devoted to calcium metabolism with particular reference to the intravenous use of calcium chloride for the prevention of hemorrhage in jaundiced patients. Ensuing chapters concern the preparation of jaundice patients for operation, biliary calculi producing jaundice, renal and hepatic insufficiency in obstructive jaundice, stricture of the common and hepatic bile ducts with methods for relieving such strictures and plastic reconstruction of these ducts, complications following operations for relief of stricture of the common and hepatic ducts, duodenal fistula following an anastomosis

between the biliary and the intestinal tract, cholecystenterostomy for tumors of the head of the pancreas, and the composition and character of bile following relief of biliary obstruction. No problems are more intimately connected with problems of physiology and of chemistry than those dealing with obstructive jaundice. There is no phase of operative surgery that requires such expertness of technic or that so often presents such insurmountable difficulties as plastic repair and reconstruction of the hepatic and common bile ducts. This small monograph represents "all there is" on the subject of obstructive jaundice. It is beautifully illustrated and is a fine piece of work. It is destined to find an important place in the literature of bile tract surgery.

RÖNTGENKUNDE IN EINZELDARSTELLUNGEN. Herausgegeben von H. H. Berg und K. Frik. Band III: Wilhelm Conrad Röntgen und die Geschichte der Röntgenstrahlen. Von Dr. Otto Glasser. Mit einem Beitrag, Persönliches über W. C. Röntgen. Von Margret Boveri. Paper. Price, 27 marks. Pp. 337, with 96 illustrations. Berlin: Julius Springer, 1931.

This volume appears at a time when there is renewed interest in the American technical literature in the historical data connected with Roentgen's epochal discovery. Here is a contribution indispensable as a fountain of information to every historically minded member of the profession familiar with the German language. It is of interest to note that the author of this volume is in the United States and connected with the Cleveland Clinic. Time and again biased and unbiased opinions have been expressed on the priority of the discovery. This discussion, covering five pages, therefore is welcome. Some of the photographic reproductions in the volume will be recognized by the reader, since they have appeared in numerous other publications. However, there is a wealth of little known material in both the text and the reproductive parts. One may well muse on the impression which the first x-ray pictures, with which the book is so richly illustrated, must have had on the scientific workers of that period. Not only the medical side but also the industrial phase of the development of x-rays is discussed from the historical point of view. There is also a chapter on the relation of the x-ray industry on patent questions. It is not generally known that the pressure on Roentgen to commercialize his discovery from American and other sources was great, but Roentgen was not the man to yield in such matters. Interesting also is a short illustrated chapter on the humorous side of the discovery as viewed from the standpoint of the populace and the press. Considerable space is devoted to the private life of Roentgen in the chapter written by Margret Boveri. This part is richly illustrated.

MEDICINA IN NUMMIS. A DESCRIPTIVE LIST OF THE COINS, MEDALS, JETONS RELATING TO MEDICINE, SURGERY AND THE ALLIED SCIENCES. By Horatio Robinson Storer, M.D., LL.D. Edited by Malcolm Storer, M.D. Cloth. Pp. 1146, with illustrations. Boston: Wright & Potter Printing Company, 1931.

Numismatics is a subject which has always interested the historically minded, though little has been done to popularize it, even in general fields. The present volume, which was compiled by Horatio R. Storer and edited by his son, Malcolm Storer, both physicians, is an attempt to make a complete descriptive catalogue of "medals relating to physicians, surgeons, veterinarians, dentists, pharmacists, empirics, hospitals, medical colleges and societies, epidemics, sanitation and in fact, everything connected with the medical art." The result is an exhaustive and detailed list of more than 8,000 entries. The arrangement of the volume strikes one as being rather effective. First comes an interesting if somewhat spicy chapter on ancient medical coins. Then follows the catalogue proper, which is divided into personal medals, arranged alphabetically according to the name of the person concerned, and general medals, which are listed under such headings as barber-surgeons, diseases and operations, expositions, hospitals, and medical events, these in turn being classified as to name of person or place concerned. Under each individual entry the compiler gives the name of the medal and the occasion for which it was struck, a description of the contents of both the obverse and the reverse side of the coin, with a note as to its size and the material used in it, and a mention of the most important catalogue or bibliography in which the coin has already been completely described. The appeal of such a bibliography is of course necessarily limited. Numismatists, and medical numismatists in particular, bibliographers, historians and dabblers in medical antiquities or curiosities will find here a wealth of material for their information and delight, to which the exhaustiveness of the study and the excellent bibliography will contribute only advantageously. Because of its completeness and the brevity of its entries, the index should be a valuable guide to the uninformed who are seeking enlightenment on the subject of medical coins and medals. At the risk of being considered a carping critic one must repeat, however, that the book does have a limited appeal. One questions, too, the wisdom of the author's declared intention of making this an exhaustive list. Complete bibliographies are, of course, always desirable—theoretically, at least. But one is moved to wonder, sometimes, whether discrimination is not at least as valuable an attribute as scholarly thoroughness. Entry 5793a is a case in point. "Stiff no. 75," the description reads, "Check for cadaver in anatomy department of University of Michigan." Of course, to be complete the list would have to contain this notice. But it would seem that the cause of medical numismatics would in no wise have been irreparably injured if such entries—and there are many others similar to this one—had been entirely omitted from an otherwise scholarly and informative volume.

THE THOMSEN HEMAGGLUTINATION PHENOMENON: PRODUCTION OF A SPECIFIC RECEPTOR QUALITY IN RED CORPUSCLES BY BACTERIAL ACTIVITY. By V. Friedenreich. Paper. Pp. 138, with 12 illustrations. Copenhagen: Levin & Munksgaard, 1930.

The author has prepared in monographic form an elaboration of the original studies of a peculiar agglutination phenomenon of red blood cells now known as the Thomsen hemagglutination phenomenon. In the first chapter he briefly considers some of the fundamental points concerning hemagglutination. The work then deals with the specific propagative agent discovered by Oluf Thomsen in 1927 that has a characteristic effect on the iso-agglutinability of human blood corpuscles. From the summary of the author's investigation it seems possible that human blood corpuscles of any group may be changed through the influence of a propagative, transmissible agent so that they become agglutinable in any human serum and the serum from the same individual. The general properties of the corpuscles are not changed in the transformation process but differ from normal ones only in the altered agglutinability. As a result of the author's investigations he regards the transformation as an enzymotic process by which a common, serologically nondemonstrable constituent is converted into a substance of specific receptor character. The serologic consequences of the changes are discussed. The work is of exceptional academic interest to those interested in serologic studies. It will also be of great practical interest to those interested in the mechanism of transfusion shock. The author cites reports in the literature and experiences of his own as instances of bacterial transformation as a source of error in blood grouping. Suggestions are offered for the prevention of the transformation and the recognition of the phenomenon when it does occur. The work is written in English, and aside from the slight peculiarities in the author's style it is comprehensive and easy to follow. An excellent bibliography is given covering the phases of the work described in the text.

EYE, EAR, NOSE AND THROAT MANUAL FOR NURSES. By Roy H. Parkinson, M.D., Visiting Oculist and Aurist to St. Joseph's Hospital, San Francisco, California. Second edition. Cloth. Price, $2.25. Pp. 223, with 62 illustrations. St. Louis: C. V. Mosby Company, 1931.

This small manual of the eye, ear, nose and throat for nurses consists of a number of chapters presenting the anatomy of the eye, ear, nose and throat followed by a description of the more common illnesses of these regions and ending with directions for setting up instruments and solutions for the various commonly performed operations. This last part is the most valuable, as photographs of the instruments are given and convenient lists are made up. The first part of the book, while excellent, goes into anatomic and medical details which it is not necessary for most nurses to know. These details might be important for nurses expecting to specialize or for those intending to supervise eye, ear, nose and throat operating rooms.

CHIRURGIE DE L'ULCÈRE GASTRIQUE ET DUODÉNAL, (INDICATIONS, RÉSULTATS). Par N. Hortolomei, professeur de clinique chirurgicale, Faculté de médecine de Jassy, et V. Butureanu, maître de conférences, Faculté de médecine de Jassy. Paper. Prices, 45 francs. Pp. 407, with 75 illustrations. Paris: Masson & Cie, 1931.

The purpose of the book is to consider the consensus regarding the treatment of gastric and duodenal ulcer in general and from the surgical point in particular. The question of treatment of ulcer is complex. The number of methods proposed is numerous, evidencing the fact that as yet there is no single accepted efficacious mode of treatment. Basing their work on an extensive review of the literature interpreted in the light of their own experience, the authors discuss the indications for surgery and then describe the various methods employed not from the standpoint of technic but from the point of view of the results obtained by each one of these. Medical treatment, according to them, is of questionable value and should not be persisted in too long. The surgical methods considered are classed in two groups, the indirect and the direct. Under indirect methods they class dilation of the pylorus, pyloroplasty, gastroduodenostomy, gastro-enterostomy, pyloric exclusion, cholecystogastrostomy, jejunostomy, and section of the gastric nerves. The direct methods include excision of the ulcer, resection of the lesser curvature, sleeve resection, subtotal gastrectomy and total gastrectomy. The book is written simply, clearly and convincingly. The deductions are logical though colored somewhat by personal experiences. The authors conclude that the last word concerning the surgical treatment of ulcer has not been said. The method which at present offers the greatest guarantee of cure is extensive resection. It gives symptomatic relief and is followed by fewer postoperative complications.

OPERATIVE SURGERY: GENERAL AND SPECIAL CONSIDERATIONS. By Dr. Martin Kirschner, Professor of Surgery and Director of the Surgical Clinic at the University of Tübingen (Germany). Authorized translation by I. S. Ravdin, B.S., M.D., J. William White Professor of Research Surgery, University of Pennsylvania. First American edition from second German edition. Cloth. Price, $12. Pp. 666, with 746 illustrations. Philadelphia: J. B. Lippincott Company, 1931.

This volume is beautifully and completely illustrated. The artistically executed illustrations, most of them in color, supplement the text, making the study of the book a real pleasure. It deals essentially with the principles of surgery on a broad basis and considers primarily those methods which have proved useful in the author's clinic. The general examination of the patient, including the preoperative preparation, the position of the patient on the operating table and the general principles of operative technic, are described in detail. The control of pain by general and local anesthesia is discussed extensively. Control of infection and hemorrhage follows. Operations on the skin, muscles, tendons and fascias, blood vessels, nerves, bones, joints and amputations conclude the text. The book is written clearly and simply. A great deal of credit is due to the translator, who expressed the author's ideas faithfully while avoiding the awkwardness of literal translation. The book will be useful to young surgeons as well as experienced ones, as it contains advice on matters seemingly unimportant as well as on rare and unusual methods.

KURZES HANDBUCH DER OPHTHALMOLOGIE. Herausgegeben von F. Schieck und A. Brückner. Band IV: Conjunctiva. Cornea. Sclera. Verletzungen. Berufskrankheiten. Sympathische Erkrankung. Augendruck. Glaukom. Bearbeitet von E. Cramer, H. Köllner, W. Reis, F. Schieck und R. Thiel. Paper. Price, 165 marks. Pp. 874, with 463 illustrations. Berlin: Julius Springer, 1931.

The fourth volume of this short (?) handbook appeared in good time and upholds fully the standards set by the three preceding volumes. Diseases of the conjunctiva, cornea and sclera, occupying the first 432 pages, was written by one of the editors, Schieck of Würzburg. These three chapters are comprehensive and contain the most modern views on classification and etiology. The clinical descriptions, the pathologic details and the illustrations are excellent, but the therapy is not as comprehensive as could be wished for. The bibliography is fairly complete so far as modern German literature is concerned and rather meager otherwise. The next chapter is on injuries and occupational diseases of the eye, by the late Cramer of Cottbus. Of course, any chapter on injuries must consist of merely a compilation of possibilities. The occupational disease section is thorough and well done, embracing conditions that the average ophthalmologist never sees. It is well known that compensation for eye injuries is viewed from an entirely different standpoint abroad than here, but the author has gone into various phases of the subject so clearly that an excellent bird's eye view is at hand. The tables of the American Medical Association are given due credit. This chapter is naturally followed by one on sympathetic ophthalmia by W. Reis of Bonn, who believes in sympathetic irritation. Sixty-eight pages are given to the subject. It is rather interesting to note that the author regards sympathetic papilloretinitis as a clinical entity, entirely separate from sympathetic ophthalmia, a view that is not universally accepted. The last 175 pages are devoted to two chapters on the physiology and pathology of intra-ocular pressure and glaucoma, both by R. Thiel of Berlin. The first chapter is a fairly complete analysis of modern opinions on that as yet undecided question. The second chapter is purely clinical and is a good presentation of the modern concept of glaucoma in all its manifestations. Particularly good is that part dealing with the diagnosis of early simple glaucoma. The therapy is sound common sense, based on modern accepted practices.

A MANUAL OF CLINICAL LABORATORY METHODS. By Clyde Lottridge Cummer, Ph.B., M.D., F.A.C.P., Instructor in Dermatology and Syphilology, School of Medicine, Western Reserve University. Third edition. Cloth. Price, $6.75. Pp. 585, with 185 illustrations. Philadelphia: Lea & Febiger, 1931.

Books on clinical laboratory diagnosis are similar in that all of them have chapters on the examination of the blood, feces, stomach contents, urine, sputum, and other subjects, by means of tests which have been acknowledged to be of value in the diagnosis of disease. Cummer has excluded many alternative methods and omitted complete references to the literature in order to keep the book of a convenient size. His style is concise. The many illustrations are excellent. To this edition have been added descriptions of the alcohol test-meal; the cistern puncture; the histamine test for studying the secretion of hydrochloric acid by the stomach; Schilling's simplified method for the Arneth count; the agglutination test for tularemia and undulant fever; the sedimentation of red blood cells; the diagnosis of granuloma inguinale; the Queckenstedt test on the spinal fluid; agranulocytic angina, and others. In addition, some other sections in previous editions have been expanded, such as that on the Kahn test for syphilis, while a section on the Kline reaction has been added.

LA CULTURE DES TISSUS EN BIOLOGIE EXPÉRIMENTALE. Par Emile C. Craciun, maître de conférences à la Faculté de médecine de Bucarest. Préface du Professeur G. Roussy. Paper. Price, 55 francs. Pp. 441, with 72 illustrations. Paris: Masson & Cie, 1931.

This is an extensive review, in French, of the methods and accomplishments of the culture of tissues in vitro. It is divided into chapters dealing with the various tissue culture technics, the characteristics of the growth of the four primary tissues in vitro, factors of growth and cytology of cultures, and results of tissue culture as applied to problems of physiology, pharmacology, pathologic anatomy, bacteriology and cancer. There is also a chapter on the cultivation of tissues of lower animals and of plants. In the chapter on technic, the methods for the microscopic examination of the cultures are treated much too briefly. For the most part, however, the work is well done. It is to be recommended for beginners in this field of investigation and should appeal to the average medical worker and biologist who desires information on the accomplishments and the possibilities of tissue culture. By virtue of its broader scope and greater accuracy, this monograph is superior to that of Bisceglie and Juhász-Schäffer in the same field. To the extent that it deals more fully with the results of tissue culture workers in all countries and is not so predominantly a report of the work of one school, this review is better than that of A. Fischer. It does not contain, however, the results of original investigation as does that of Fischer. Perhaps too much prominence is given to the theories of various French investigators and thinkers. In general, the world literature on the subject is covered equitably, although more emphasis might have been given the results of American investigators, for tissue culture is still primarily an American achievement. The monograph is supplied with an extensive bibliography and

an index. The only really adverse criticism which might be directed against the book is not based on a lack on the part of the author but is inherent in the subject matter. It is obvious that in a review of the vast fields of the various biologic and medical sciences in which tissue culture has been applied, no single reviewer could be expected to be equally critical throughout. An example of this is to be found, for instance, in the author's misunderstanding of the points of difference in some of the leading theories on the histogenesis of inflammation. Such errors in a review of work in such a vast subject as tissue culture can be obviated only by having specialists in each of the separate fields contribute the discussions on those topics of which they are masters.

A CLINICAL STUDY OF ADDISON'S DISEASE. By Leonard G. Rowntree, M.D., and Albert M. Snell, M.D., Division of Medicine, the Mayo Clinic and the Mayo Foundation, Rochester, Minnesota. Mayo Clinic Monographs. Cloth. Price, $4. Pp. 317, with 41 illustrations. Philadelphia: W. B. Saunders Company, 1931.

This is a detailed discussion of the historical and clinical aspect of Addison's disease, including the more recent methods of treatment with epinephrine and cortical extracts of the suprarenals. The information is complete and the contents of this small volume furnish detailed information of practical value. Case histories and historical data form the bulk of the book. There is sufficient good material, especially of recent interpretation, to make this a valuable book for the general practitioner.

RADIOLOGISCHE PRAKTIKA. Herausgegeben von Prof. Dr. W. Alwens, usw. Band XVII: Röntgendiagnostik der Gallenblase. Von Priv.-Doz. Dr. F. Eisler und Dr. G. Kopstein. Cloth. Price, 18.60 marks. Pp. 153, with 151 illustrations. Leipzig: Georg Thieme, 1931.

This volume, which is one of a series of radiologic handbooks, is an excellent summary of present knowledge concerning the roentgen diagnosis of gallbladder disease. The authors divide the book into two parts, the first of which deals with our knowledge of gallbladder disease before the era of cholecystography. The latter part concerns cholecystography. It is interesting that the authors devote only 4½ pages to the discussion of the roentgen diagnosis before the era of cholecystography, as compared with 128 pages devoted to cholecystography. There is also a short discussion of the physiology and the anatomy of the gallbladder. The illustrations are excellent and the book can be recommended as a satisfactory presentation of modern conceptions of the roentgen diagnosis of gallbladder disease. There is an extensive bibliography and the authors are thoroughly acquainted with the American literature, from the first article by Graham and Cole on cholecystography down through the more recent work.

THE PRACTICE OF MEDICINE. By A. A. Stevens, A.M., M.D., Professor of Applied Therapeutics in the University of Pennsylvania. Third edition. Cloth. Price, $8. Pp. 1150, with 36 illustrations. Philadelphia and London: W. B. Saunders Company, 1931.

Many chapters in this edition have been rewritten and much of the text that was in the previous edition has been deleted, as it was no longer considered in accord with the best modern teaching. Reference has been made for the first time to such new subjects as psittacosis, immunization to measles and scarlet fever, massive collapse of the lung, the antitoxin treatment of erysipelas, vaccinal encephalitis, hyperthyroidism and hypothyroidism. In its present form the book presents a conservative view of the essentials of internal medicine.

DIE CHIRURGIE DES KROPFES. Von Regierungsrat Primarius Dr. Karl Urban, Vorstand der chirurgischen Abteilung und Leiter des Spitales der Barmherzigen Schwestern in Linz a. D. Paper. Price, 6.80 marks. Pp. 85, with 50 illustrations. Leipzig: Franz Deuticke, 1931.

Thyroid surgery in America is concerned chiefly with the surgery of thyrotoxicosis, which condition forms the common indication for surgery in this country, and with which phase of thyroid disease our literature has been almost entirely concerned. Hence it is that virtually no monograph such as this meets the requirement of the average American surgeon. The text is brief and in a sketchy way covers asepsis, anesthesia, indications, technic, complications, malignant conditions, exophthalmic goiter and twelve or fifteen allied topics. The descriptions and illustrations of technic seem inadequate and at best are more readily adapted to the large colloid goiter rather than to the exophthalmic goiter or toxic adenoma.

Medicolegal

Practice of Dentistry by Corporation Unlawful

(State v. Bailey Dental Co. (Iowa), 234 N. W. 260)

The Bailey Dental Company was incorporated under the laws of Iowa for the purpose of equipping and maintaining offices and places where licensed dentists might carry on the practice of dentistry. No officer of the corporation was licensed to practice dentistry in Iowa. The corporation employed licensed dentists, who engaged in the practice of dentistry under the name of the corporation. The attorney general of Iowa instituted a suit in equity to restrain the defendant corporation from practicing dentistry in the state. The district court, Polk County, issued an injunction and the defendant corporation appealed to the Supreme Court of Iowa. There the judgment of the district court was affirmed.

The corporation contended that it was not engaged in the practice of dentistry; that its sole business was owning and operating offices in which the art of dentistry was practiced by duly licensed dentists. The practice of dentistry, argued the corporation, and the owning and operating of dental offices where dentistry is practiced, are two distinct functions. Answering these contentions, the Supreme Court of Iowa said that immediately on its incorporation the defendant corporation opened an office in the city of Des Moines and equipped an office for the purpose of practicing dentistry. It employed licensed dentists for its work. It advertised the practice of dentistry under its corporate name and not otherwise. The ownership and control of the entire equipment was in the corporation and its unlicensed officers, and not in the employees who were licensed dentists. These unlicensed officials necessarily determined all its policies, said the court, whether they were professional or commercial. If such officials were to carry on a similar business as individuals, without the formality of a corporate organization and without a license, they would be amenable to the dental practice act. If these officials could not, continued the court, as individuals, conduct this business without a license, there is no reason why they should be permitted to do so under a corporate name. If a business conducted by an individual is unlawful, it is likewise unlawful if conducted by a corporation.

It was argued by the corporation, however, that the dental practice act constituted an unreasonable interference with the natural right of the defendant to do business. This is not a case, said the court, where new legislation purports to take away rights that have been acquired and have vested under previous legislation. It is therefore not a case of legislative impairment of existing contracts. The corporation contended that its charter authorized it to transact the very business for the doing of which it was being prosecuted. The recitals of the articles of incorporation, observed the court, define the limitations of the business which the corporation proposes to do. These recitals did not confer on the corporation authority to transact any business in violation of existing law. Under the law existing when the corporation received its charter, said the court, no person had a right to practice dentistry without an examination and license. From the very nature of this statutory requirement, a corporation could not bring itself within the terms of the statute. It could not pass an examination and could not therefore obtain a license. There are certain fields of occupation which are universally recognized as learned professions. Proficiency in these occupations requires long years of special study and training. Without such preparation, proficiency is impossible. The law recognizes them as a part of the public weal and protects them against debasement and encourages the maintenance therein of high standards of education, of ethics and of ideals. Rigid examinations are required and conducted preliminary to the granting of a license. The act could be completely avoided and rendered nugatory, observed the court, if one or more persons, who failed to have the requisite learning to pass an examination, might nevertheless incorporate and practice lawfully the profession which was forbidden to them as individuals. A corporation, as such, has neither education nor skill nor ethics.

We deem it clear, concluded the Supreme Court, that the defendant corporation was practicing dentistry within the meaning of the dental practice act of Iowa. It was necessarily doing so without a license. It was doing so therefore in violation of the law. Inasmuch as a corporation, by its very nature, is incapable of passing an examination for the purpose of a license, and therefore incapable of receiving a license, it cannot lawfully practice dentistry in Iowa.

Evidence: Fragments of Fractured Skull in Evidence; Admissibility of Hospital Records.—The plaintiff's skull was crushed in an automobile accident. Eight pieces of splintered bone were taken from the brain and were placed in a small bottle by the operating surgeon. In a suit by the plaintiff to recover damages for her injuries, the operating surgeon testified that he did not recall definitely how many pieces of bone he removed from the plaintiff's brain. He then produced, apparently to refresh his memory, the bottle in which he had placed the fragments of the skull. The bottle was later admitted in evidence, over the objection of the defendant. The plaintiff claimed that the offering of the exhibit was for the purpose of establishing the number of bone pieces removed from the brain, the operating surgeon not being able to testify definitely from memory in that regard. The bottle was a small one, said the Supreme Court of Minnesota, and the exhibit was not of a gruesome nature. No error was committed in admitting the bottle in evidence. The plaintiff's hospital chart also was admitted in evidence. The operating surgeon identified it as the original hospital chart made and kept in the plaintiff's case. He testified that it was a record of what had transpired during the various hours of each day and that it contained statements as to the temperature, pulse, and other incidental matters relative to the patient's condition and treatment. The entries were made by two special nurses in the usual course of the hospital business. He testified that such a hospital record was made for every patient in the hospital and that the entries therein were true and correct. The defendant contended that no proper foundation had been laid for the admission of this hospital chart, that it was a self-serving declaration on the part of the plaintiff and was hearsay. The trial court, in admitting the chart, said that it was doubtful if there was anything in it not covered by the testimony of witnesses. Under these circumstances, said the Supreme Court of Minnesota, the chart was properly admitted in evidence.—*Lund v. Olson (Minn.), 234 N. W. 310.*

Damages: Release Based on Physician's Opinion.—The plaintiff fell down the steps of one of the defendant's street cars and suffered an injury. He employed his own physician to treat him. This physician informed the plaintiff that he would be in bed from four to five weeks, if not longer, and then would have to wear a strap or brace for his back. A physician for the defendant street railway company later examined the plaintiff and informed him that there was nothing much the matter with him and that he would be all right in a few days. After some dickering, the plaintiff accepted a cash settlement as compensation for his injuries and signed a release absolving the defendant from further liability. Later he sought to have this release set aside, contending that it had been executed on the strength of the statement of the defendant's physician that he, the plaintiff, would be all right in a few days. But, said the Supreme Court of Minnesota, the plaintiff had been informed by his own physician that he would be confined to his bed for five weeks or longer and he must therefore have known at the time he gave the release what his injury was and its probable result. Reliance on the opinion of the defendant's physician, who saw the plaintiff only once and did not treat him, was not a sufficient ground for avoiding the release. If false representations as to the character and extent of a plaintiff's injury are made by a physician or agent of the other party, for the purpose of inducing a settlement, and such representations cause the plaintiff to be deceived regarding existing facts as to the nature and extent of his injury, he may avoid a release given in reliance thereon, notwithstanding the good faith of the one making the representations. But if the representations made are correct as to the nature and extent of the injury, or if the plaintiff is not deceived thereby, the fact that an opinion as to the duration of the disability, honestly given, turns out to be erroneous, is not a sufficient ground for avoiding the release.—*Fornaro v. Minneapolis Street Ry. Co. (Minn.), 234 N. W. 300.*

Medical Practice Acts: Due Process in Revocation Proceedings; Prior Court Conviction Not Necessary.—In revoking a physician's license, the Michigan state board of registration in medicine is not required to proceed in strict accordance with rules applicable to judicial tribunals. Requisite proof may be had by deposition. The right to compulsory process is not indispensable. Unless the right is waived, the physician whose license is sought to be revoked is entitled to (1) notice of the time and place of hearing; (2) a hearing before a properly authorized body; (3) a reasonably definite statement of the charge or charges against him; (4) the right to cross-examine the witnesses who testify against him; (5) the right to produce witnesses in his own behalf, and (6) a full consideration and a fair determination according to the evidence by the body before whom the hearing is had. Where there is no demand for an opportunity to cross-examine a witness, the sworn statement of such witness is competent to establish the charge against the physician. It is not necessary that a physician be first convicted in a court of criminal jurisdiction before the board may institute proceedings to revoke his license. The medical practice act of Michigan specifies that the board shall consist of ten members, composed of not more than five members representing the regular school of medicine, not more than two representing the homeopathic school, not more than two representing the eclectic school, and not more than one representing the physiomedical school. The fact that the board is composed of seven members of the regular school, two of the homeopathic, one of the eclectic and none of the physiomedical does not nullify the action of the board in revoking the license of a physician. The board, so constituted, is, in the opinion of the Supreme Court of Michigan, a de facto board.—*Hanson v. Michigan State Board of Registration in Medicine (Mich.), 234 N. W. 476.*

Workmen's Compensation Acts: Refusal to Undergo Operation.—Where an employee, seeking compensation under the workmen's compensation act of Oklahoma, unreasonably refused to undergo a minor operation, simple, safe, and reasonably certain to effect a cure, the continuing disability suffered by the employee is held to result not from the original injury but from his own wilful act. Whether or not such a refusal is unreasonable presents a question of fact to be determined from the evidence. The burden of proving that the tendered operation is simple, safe, and reasonably certain to effect a cure, is on the employer. A court will not speculate, said the Supreme Court of Oklahoma, as to what might be the outcome of an operation.—*Consolidated Lead and Zinc Co. v. State Industrial Commission (Okla.), 295 P. 210.*

Society Proceedings

COMING MEETINGS

American Society of Tropical Medicine, New Orleans, November 18-20. Dr. Benjamin Schwartz, P. O. Box 131, Pennsylvania Avenue Station, Washington, D. C., Secretary.

Association of Military Surgeons of the United States, New Orleans, November 30-December 2. Dr. J. R. Kean, Army Medical Museum, Washington, D. C., Secretary.

Central Association of Obstetricians and Gynecologists, Chicago, October 29-31. Dr. E. D. Plass, University Hospital, Iowa City, Sec'y.

New York State Association of Public Health Laboratories, Albany, November 6. Miss M. B. Kirkbride, New Scotland Avenue, Albany, Secretary.

Philippine Islands Medical Association, Manila, December 15-18. Dr. A. S. Fernando, 817 Taft Avenue, Manila, Secretary.

Radiological Society of North America, St. Louis, November 30-December 4. Dr. I. S. Trostler, 25 East Washington Street, Chicago, Secretary.

Southern Medical Association, New Orleans, November 18-20. Mr. C. P. Loranz, Empire Building, Birmingham, Alabama, Secretary.

Southern Surgical Association, White Sulphur Springs, W. Va., December 8-11. Dr. Robert L. Payne, 142 York Street, Norfolk, Va., Secretary.

Western Branch of American Urological Association, San Francisco, Nov. 6-7. Dr. H. W. Howard, 193 Eleventh St., Portland, Ore., Sec'y.

Western Surgical Association, Denver, December 4-5. Dr. Frank R. Teachenor, 306 East Twelfth Street, Kansas City, Mo., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Issues of periodicals are kept on file for a period of five years only. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending, but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

1: 277-354 (July) 1931

Pathologic Anatomy as Keystone of Practice of Clinical Pathology. K. M. Lynch, Charleston, S. C.—p. 277.
*Comparison of Different Culture Methods for Isolation and Growth of Myobacterium Tuberculosis: Experimental Study. S. H. Feldman, Rochester, Minn.—p. 285.
*Comparison of Culture and Animal Inoculation of Sputum in Diagnosis of Tuberculosis. A. Stadnichenko and H. C. Sweany, Chicago. —p. 305.
Cholesterol Equilibrium in Light of Some Recent Studies. A. T. Brice, Jr., Palo Alto, Calif.—p. 315.
*Glycerin as Adjuvant to Bacterial Dyes. F. M. Huntoon, White Haven, Pa.—p. 317.
*Pathogenesis of Goiter. B. Markowitz, Bloomington, Ill.—p. 321.
Antirabic Vaccinations at Charity Hospital of New Orleans for the Years 1929-1930. R. D'Aunoy and J. L. Bevan, New Orleans.—p 333.
*Degenerative Lesions of Appendix (Appendicosis) Hitherto Undifferentiated from Appendicitis. B. Steinberg, Toledo, Ohio.—p. 339.

Growth of Mycobacterium Tuberculosis.—Feldman compares the efficiency of different cultural procedures for the demonstration of Mycobacterium tuberculosis in infective material. A total of twenty-seven specimens of human origin and nineteen specimens of bovine origin was utilized. The culture mediums used were the crystal violet-glycerin-water-potato medium of Corper and Uyei; the egg yolk-glycerin-broth medium of Miraglia and a slight modification of the meat-cream-milk-egg combination of Sweany and Evanoff. Five per cent oxalic acid solution and 3 per cent sodium hydroxide solution were used to control contaminants. Portions of the material used for the cultural attempts were also used to inoculate guinea-pigs and a slightly higher percentage of positive results were obtained from the animal inoculations than from the respective culture mediums. The modified medium of Sweany and Evanoff yielded a greater number of positive results from both the human and the bovine material. In most instances the medium of Miraglia, which was inoculated with the human material, promoted the growth of acid-fast bacilli earlier than the other mediums used.

Sputum in Diagnosis of Tuberculosis.—Stadnichenko and Sweany made a comparative study of microscopic sputum examinations, with guinea-pig inoculation and culture, on selected series of 200 patients, 49 of whom were children under 15 years of age. Twenty-four hour sputum specimens were used for the experimental work and treated with 3 per cent solution of sodium hydroxide. Half were inoculated into a guinea-pig, and half were cultured on the cream medium of Sweany and Evanoff. This series was divided into four groups, based on cultural and animal observations. The first, or largest, group consisted of 131 patients, found negative both on guinea-pig inoculation and on culture. The second, which consisted of thirty-three patients, was found positive both on guinea-pig inoculation and on culture. The third group, which consisted also of thirty-three patients, was found positive on guinea-pig inoculation only. The last, or fourth, group, which consisted of three patients, was found positive on culture only. The experimental work gave sufficient data to indicate that guinea-pig inoculation was superior to the cultural method for badly contaminated material, but culture study has the advantage of being more absolute, more inexpensive, and permitting of more repetitions. Atypical acid fast bacilli should be carefully considered but only as suspicious forms until they have produced typical tuberculosis in animals.

Glycerin as Adjuvant to Bacterial Dyes.—Huntoon calls attention to the fact that in every laboratory where bacterial staining is a routine procedure, and particularly in those laboratories where such staining is only an occasional necessity, annoyance has been caused by the tendency of certain prepared dye solutions to deteriorate and to precipitate either on the slide or in the bottle. This is especially annoying in the dyes used to perform the gram stain. In a search for dye solutions that would not have these characteristics, he tried glycerin as an adjuvant. This substance in the proper strength acts as a preservative in helping to keep the dyestuffs in solution and apparently as a mordant in increasing staining values, and aids by clearing up the background, giving sharp and clear microscopic pictures. The author gives the composition of three stains (glycerin crystal violet gram, glycerin carbolfuchsin, glycerin methylthionine chloride) with which he has obtained excellent results.

Pathogenesis of Goiter.—Markowitz believes that colloid nodular goiters or so-called colloid adenomas are the results of degeneration dependent on hyperplasia followed by involution and hyperinvolution; that the so-called toxic adenomas differ only from the nontoxic colloid nodular goiter in that they contain areas of hypo-involution, in which hyperplasia was not followed by involution; that the so-called toxic adenomas are frequently not toxic per se, in which case they are pathologically the same as the nontoxic type, but are associated with hyperplasia in a separate portion of the thyroid not included in the encapsulated nodule. Further, it is highly probable that similar factors are involved in the production of both hyperplastic and colloid types of goiter; that the simple colloid goiter is only an end result of hyperplasia which is mild and not rapid in its course; that the nodular colloid goiter is of similar origin, but differs in that the hyperplasia-involution cycle occurred only in certain areas; that the toxic nodular colloid goiter or toxic adenoma is also of the same origin, but here while the hyperplasia-involution cycle occurs there are a few areas of hypo-involution in which hyperplasia persists; that the true hyperplastic or exophthalmic goiter is one in which there is marked rapid and unarrested hyperplasia not followed by any form of involution.

Degenerative Lesions of Appendix.—Steinberg observed certain abnormal changes in some which ordinarily are classified by the pathologist as normal, although the clinician observed in the patient signs and symptoms which were relieved by appendectomy. These observations prompted a systematic study of 1,500 surgically removed appendixes. The study included the correlation in a selected number of cases of the clinical history, the pathologic changes, the bacteriologic examination of the appendical contents and a follow-up of the patients' condition a year or more after the appendectomy. As a result of the study, a group of appendixes in which inflammation played no part in the pathologic picture was differentiated. The abnormal changes were retrogressive and degenerative in character and terminated in death of tissue. The term appendicosis is proposed by the author to designate the pathologic changes in these appendixes. Two types of appendicosis were distinguished. The first, essentially retrogressive in nature, is characterized by a diminished width of the mucosal layer of the organ, a compression of lymph follicles, a general decrease in the number of mucosal cells and an increase in fibroblasts. Frequently, the usual lining columnar cells are replaced by either cuboidal or flat epithelial cells. The muscularis may participate in the general diminution of the width of the organ. The lumen of the organ is dilated and almost invariably contains large amounts of fecal material. Occasionally, proximal to the dilated part of the organ there is narrowing or complete stenosis of the lumen. For this type of appendicosis the term pressure atrophy is proposed. Apparently the pressure atrophy type of appendicosis is due to the failure of the appendix to expel the fecal contents properly, which continue to accumulate and result eventually in the compression of the wall of the organ. The second type of appendicosis is degenerative in character and is distinguished by the tendency of formation of erosions. A small area of the lining cells and the mucosa is destroyed and replaced either by blood in lesions of recent origin and by feces or by connective tissue in lesions of longer duration. These erosions frequently extend through the entire width of the mucosa to the submucosa. The erosions may be single or multiple. In comparatively old lesions the eroded area is surrounded by free and phagocytosed hemoglobin particles. Not infrequently the same appendix may show,

in other places, evidences of pressure atrophy. The lymph follicles are usually hyperplastic with large and active germinal centers, especially in early lesions. There is frequently an increase of eosinophils and large mononuclears in the mucosa surrounding the erosion. The tubular glands show moderate secretory activity. The lumen in the location of the eroded area may be very narrow but is occasionally wide. The erosion is most frequently located at the base of a crypt. Erosion type of appendicosis is the term proposed for this form of appendiceal lesion. It is the author's opinion that the erosion type of appendicosis is produced by sharp particles of feces and that the lack of an inflammatory reaction is due either to absence of bacteria or to presence of avirulent organisms.

American J. Obstetrics & Gynecology, St. Louis

22: 173-340 (Aug.) 1931

Relation of Forceps and Cesarean Section to Maternal and Infant Morbidity and Mortality. E. D. Plass, Iowa City.—p. 176.
Sperm Morphology in Relation to Fertility. G. L. Moench and Helen Holt, New York.—p. 199.
Urinary Tract Infections During Pregnancy. H. L. Morris and L. J. Langlois, Detroit.—p. 211.
Studies on "Avertin." H. J. Stander, Baltimore.—p. 219.
Effect of Anterior Hypophyseal Implants on Senile Ovaries of Mice. J. Hoffman, Philadelphia.—p. 231.
Perforating Chorionepithelioma of Uterus with Free Intraperitoneal Hemorrhage. B. M. Anspach and J. Hoffman, Philadelphia.—p. 239.
End-Results in Treatment of Carcinoma of Cervix with Radium. L. C. Scheffey and W. J. Thudium, Philadelphia.—p. 247.
Tuberculosis of Corpus Uteri Without Involvement of Endometrium. R. Brown, New York.—p. 255.
New Forceps with Traction Curve. E. H. Dennen, New York.—p. 258.
Study of Five Hundred Blood Transfusions. W. K. Burwell, Vancouver, B. C.—p. 261.
Fatal Uremia Due to Complete Prolapse of Uterus. R. T. Frank, New York.—p. 270.
Thyrotoxicosis Complicated by Pregnancy. A. J. Fleischer, New York. —p. 273.
Differential Diagnosis of Acute Initial Salpingitis and Appendicitis by Means of Menstrual Sign. J. V. Rici, New York.—p. 276.
Position of Uterus Based on Study of Spinal-Pelvic Relationship: Five Hundred Cases. M. O. Magid, New York.—p. 281.
Pelvic Diathermy. G. Gellhorn, St. Louis.—p. 297.
Breech Presentation. F. J. Taussig, St. Louis.—p. 304.
Placenta Accreta: Clinical Consideration, Pathology and Management. D. Feiner, New York.—p. 312.
Rigor Mortis of Fetus Causing Obstruction in Delivery; Case. M. Leff, New York.—p. 317.

American Journal of Psychiatry, Baltimore

11: 1-213 (July) 1931

Distribution of Calcium Between Blood and Cerebrospinal Fluid in Mental Diseases. S. Katzenelbogen and H. Goldsmith, Baltimore.—p. 9.
Gastro-Intestinal Motor Functions in Manic-Depressive Psychoses: Roentgenologic Observations. G. W. Henry, White Plains, N. Y. —p. 19.
Preliminary Note on Some Obscure Symbolic Muscular Responses of Diagnostic Value in the Study of Normal Subjects. M. H. Krout, Chicago.—p. 29.
A Study of the Behavior Chart in Cases of Thymergasia. H. F. Corson, Providence, R. I.—p. 73.
Grading of Patients in Mental Hospitals as Therapeutic Measure. M. H. Erickson and R. G. Hoskins, Worcester, Mass.—p. 103.
Statistical Study of Delusions in Manic-Depressive Psychoses. K. M. Bowman and Alice F. Raymond, Boston.—p. 111.
Dehydration Method in Epilepsy. D. E. Cameron, Brandon, Manitoba, Canada.—p. 123.
Treatment of Manic-Depressive Psychosis. L. E. Hinsie and S. E. Katz, New York.—p. 131.

Am. J. Roentgengol. & Rad. Therapy, Springfield, Ill.

26: 191-334 (Aug.) 1931

Recognition of Thoracic Calcification. G. R. Miller, Philadelphia.—p. 191.
Use of Opaque Oils in Diagnosis of Maxillary Sinus Disease. R. C. Beeler, L. A. Smith and J. N. Collins, Indianapolis.—p. 202.
Nasal Sinuses: Roentgenographic and Clinical Observations. B. Allen, Tampa, Fla.—p. 214.
Anomalies in Topography of Alimentary Tract. J. W. Larimore, St. Louis.—p. 223.
Comparison of Intravenous and Oral Cholecystography. S. J. Hawley, Danville, Pa.—p. 232.
Treatment of Melanotic Tumors of Skin: Pigmented Moles and Malignant Melanomas. W. A. Evans and T. Leucutia, Detroit.—p. 236.
Idiopathic Hemorrhagic Sarcoma: Case Treated by Roentgen Radiation. J. N. Collins, Indianapolis.—p. 260.
Case of Tuberculous Dacryocystitis Treated with Roentgen Rays. K. Takemura, Sobiraki, Japan.—p. 264.
Detection and Estimation of Radium in Living Persons: Normal Elimination of Radium. H. Schlunt, Columbia, Mo., and G. Failla, New York.—p. 265.
Ultraviolet Measurement with Cadmium Photo-Electric Cell. M. M. Schwarzschild, New York.—p. 272.

American Review of Tuberculosis, New York

24: 193-369 (Sept.) 1931

*Intrapleural Pneumolysis. B. N. Carter, Cincinnati.—p. 199.
*Id.: Necessary Adjunct to Artificial Pneumothorax. L. Fisher, Waverley Hills, Ky.—p. 213.
Convenient Portable Artificial Pneumothorax Apparatus. C. C. Habliston, Baltimore.—p. 236.
Note on Simultaneous Bilateral Artificial Pneumothorax: Two Cases. J. Kaminsky, Rutland, Mass.—p. 238.
Kymographic Tracings in Artificial Pneumothorax. P. Dufault, Rutland, Mass.—p. 245.
*Pregnancy and Bilateral Phrenic Exeresis Postpartum: Case. A. W. Duryea, Honolulu, T. H.—p. 256.
*Etiology and Mechanics of Massive Atelectasis. E. Korol, Lincoln, Neb. —p. 276.
Epituberculosis: Unusual Case with Autopsy Findings. B. Goldberg and B. M. Gasul, Chicago.—p. 285.
Tuberculous Abscess of Brain: Case. G. F. Evans and C. E. Smith, Hopemont, W. Va.—p. 292.
*Old Tuberculin Administered Subcutaneously for Diagnosis. J. Steidl and F. H. Heise, Trudeau.—p. 300.
*Reliability of Guinea-Pig Inoculation in Diagnosis of Tuberculosis. W. H. Feldman and T. B. Magath, Rochester, Minn.—p. 312.
*Influence of World War on Tuberculosis Mortality in Civilian Populations. W. W. Lee, North Adams, Mass.—p. 326.
"Insusceptible Strains" in Epidemiology of Human Tuberculosis. H. W. Hill, Vancouver, B. C.—p. 340.
Distribution of Diffusible and Nondiffusible Calcium in Pulmonary Tuberculosis. F. B. Cooper, Trudeau.—p. 346.
*Lysis of Tubercle Bacilli in Sputum. L. Rosenthal, Brooklyn, and Vera B. Dolgopol, New York.—p. 351.
Attempt to Grow Paramecia in Pure Cultures of Tubercle Bacilli. A. P. Damerow, Denver.—p. 363.
Summer Rest Camp of Dallas Tuberculosis Association. R. M. Smith, Dallas, Texas.—p. 367.

Intrapleural Pneumolysis.—Carter describes a method of freeing adhesions by an open pneumolysis. Reports of four cases in which this method has been successfully used are given. Open pneumolysis is preferable to closed in case of wide bands, folds, and thick fleshy, round adhesions. Closed pneumolysis is difficult and least successful in these types of adhesions but the latter may be more safely divided by the open method. In any case, save possibly those with thin string adhesions, the author prefers the open to the closed method. It seems safer to deal with adhesions directly than to divide them through a thoracoscope in which one has less control of the situation in case of hemorrhage and more chance of soiling by contamination due to cutting into the lung.

Intrapleural Pneumolysis.—Fisher states that of the pneumothorax patients residing at Waverley Hills Sanatorium since July, 1930, 28.6 per cent proved suitable for cauterization. Of this number all but one has been definitely benefited by the intrapleural pneumolysis. Ten out of sixteen (62.5 per cent) were given a perfect collapse. In all cases with pulmonary excavation the cavities have contracted anywhere from one half to completely. Closure of cavities was brought about in nine cases. In three cases, open cavities could not be seen before operation. In two cases, complete closure of cavities, after a marked initial contraction, has been impeded by sufficient mediastinal shifting, following severance of adhesions, to prevent otherwise adequate compression. In one case, however, this otherwise undesirable circumstance served to help close a cavity in the contralateral lung. One patient, who had had persistent recurrence of blood-streaked sputum for three years, has not had streaking since the second pneumothorax refill following pneumolysis. The majority of patients have shown a tendency for the sputum to become negative, with occasionally an intermittent positive. Nine have had a persistently negative sputum since operation. All patients with positive sputum have shown a decrease in the number of bacilli, according to the Gaffky scale. A number of these have bilateral disease, which may account for some failures to obtain a completely negative sputum. All patients have voluntarily noted a marked diminution in both coughing and the daily quantity of sputum. Coughing has practically disappeared and sputum has decreased at least 75 to 80 per cent in the majority of cases. Even when cavities have been only partially collapsed, marked symptomatic improvement has been the rule. A small postoperative effusion, averaging about 250 cc., developed in five cases. After a single aspiration this did not recur except in one case. One patient had fluid prior to operation, which persisted afterward. In nine cases no postoperative effusion whatever occurred. In one case a preexisting pleural effusion which had persisted for several months

disappeared entirely after operation, apparently as a result of loss of tension on adhesions. One patient who had had a preexisting tuberculous empyema for some months passed an uneventful postoperative course with perfect wound healing and as decided improvement as any case in this series. As in all forms of collapse therapy, tuberculous complications show a greater tendency to improve when the pulmonary disease has been benefited by adequate compression. Patients tolerate cauterizations lasting as long as two and one-half hours remarkably well, ensuing reactions being negligible. Bleeding other than momentary oozing was not encountered except in one case. In this instance, cautery irradiation produced prompt cessation. Diffuse, multiple folds constitute the type of adhesion most apt to contain lung tissue or large blood vessels. Occasionally, when only partial cauterization is possible, in the form of a V-notch extending toward the chest wall, subsequent pneumothorax refills may serve to peel the lung away from the parietal attachment. Complete stripping of this nature occurred in the second case reported, this patient having had a perfect collapse and negative sputum ever since. The galvanocautery affords a reasonable and safe method for cutting adhesions. Intrapleural pneumolysis is a necessary adjunct to artificial pneumothorax.

Bilateral Postpartum Phrenicectomy.—Duryea emphasizes the fact that during the later months of pregnancy diminished diaphragmatic excursion, because of the increasing intra-abdominal tumor, has a distinct therapeutic advantage. Too often, after delivery of the child, in cases of far advanced pulmonary tuberculosis, the advantage of the diminished diaphragmatic excursion is lost and a slightly progressive pulmonary lesion advances with great rapidity. Bilateral phrenic exeresis immediately after delivery of the child not only prevents this descent of the diaphragm but even causes more elevation with corresponding beneficial results. The author gives the case report of a pregnant tuberculous invalid who was carried along for the last three months of her pregnancy on simultaneous bilateral pneumothorax, which gave her almost complete symptomatic relief from her pulmonary tuberculosis. Following delivery, a bilateral phrenic exeresis was done in order that the benefit of diminished excursion from intra-abdominal tumor might not be lost. Bilateral phrenic exeresis, immediately post partum, seems a rational treatment for a pregnant woman with advanced active bilateral tuberculosis.

Massive Atelectasis.—Korol calls attention to the fact that in prolonged dorsal recumbency the occurrence of atelectasis is favored by the poor ventilation in this position (a decrease in the tidal air and vital capacity) and the inactivity of the diaphragm. Many cases diagnosed as terminal bronchopneumonia and hypostatic congestion are really instances of atelectasis. In prolonged lateral recumbency the occurrence of atelectasis is favored in the recumbent lung by the increased weight and compression exerted on the lower hemithorax and the inactivity of the lower half of the diaphragm. The various pathologic states which confine a patient to one certain posture in bed generally also interfere with vigorous respiration and coughing. Surgical operations on the chest or abdominal wall further reduce the respiratory efficiency by injuring the muscles of respiration and by causing pain on deep breathing and on turning from side to side. Occlusion of a large bronchus is not necessary for the initiation of atelectasis or for the development of the typical symptoms of dyspnea, cyanosis, efforts at expectoration and so on. Massive atelectasis can occur without the occlusion of large bronchi. The respiratory distress in such cases is caused not only by the depleted lung reserve but largely by the vicarious breathing from one lung into the other. In cases with occlusion of a large bronchus, the symptoms are precipitated by the overflow of secretions from the lower lobe bronchus into an upper lobe bronchus.

Old Tuberculin Subcutaneously.—According to Steidl and Heise, the fact that a patient has no symptomatic reaction and no focal reaction (as determined by physical signs and roentgenograms) to 0.01 cc. of old tuberculin administered subcutaneously does not exclude the diagnosis of tuberculosis. Conversely, it may occasionally happen that the natural evolution of a neoplastic or a nontuberculous inflammatory process in the lung may simulate a focal reaction. The administration of old tuberculin subcutaneously as a diagnostic method in suspected pulmonary tuberculosis is a procedure of limited value, for the intracutaneous test gives somewhat parallel information and is less inconvenient to the patient.

Reliability of Guinea-Pig Inoculation.—For the purpose of determining facts pertaining to the reliability of the guinea-pig as a test animal in the diagnosis of tuberculous infections of obscure nature, Feldman and Magath make use of clinical material from 158 consecutive clinical cases. One guinea-pig was inoculated intraperitoneally and one was inoculated subcutaneously, with a portion of each specimen. A diagnosis of tuberculosis was obtained in twenty-one cases. The livers and spleens of 201 guinea-pigs which were considered nontuberculous at necropsy were prepared for histologic study, and lesions bearing some resemblance to those of tuberculosis were present in seventeen, although none had been thought to be tuberculous on gross examination. None of the tuberculous-like lesions were subsequently proved to be tuberculous when sections were appropriately stained and examined for the bacillus of tuberculosis. Apparently there are other infections, many of them of spontaneous origin, which occasionally induce in guinea-pigs organic lesions which more or less resemble tuberculosis. The failure to demonstrate acid-fast bacilli in suggestive tuberculous lesions of guinea-pigs is presumptive evidence that the lesions are not those of tuberculosis. Inoculating guinea-pigs subcutaneously and intraperitoneally with clinical material and performing necropsy on those which are living at the expiration of eight weeks is a thoroughly dependable procedure for the determination of tuberculous infections in material in which the organism cannot be demonstrated microscopically. Animals living eight weeks after inoculations and failing to show gross lesions of tuberculosis in all probability do not have a tuberculous infection, and the microscopic examination of such tissues as a routine is not necessary. In the microscopic diagnosis of tuberculosis from the tissues of guinea-pigs that die after inoculation of material containing the human form of the infection, too much reliance should not be placed on the cellular aspects of the lesions. The presence or absence of acid-fast bacilli within the lesions constitutes the most dependable criterion for reaching a decision.

World War and Tuberculosis Mortality.—Lee studied the influence of war on tuberculosis mortality on the basis of the experience of Germany and the United States as recorded in their tuberculosis mortality rates from 1900 to 1928. Massachusetts data are used to compare with German data by age groups and by sex. The rates in the United States rose slightly but significantly during the war period and fell rapidly after the armistice to a rate about 20 per cent below the prewar trend. The German rates in 1918 exceeded those of the United States by 55 per cent. Following the war the rates dropped rapidly until 1921, to rise again during the financial crises of 1922 and 1923 to a rate 62 per cent greater than that of the United States in 1923. Following 1923 the German rates fell to the prewar trend by 1927. The peak in the German data in 1918 corresponds to the industrial activity and financial depression of the period. The peak of 1923 corresponds to the financial depression accompanying the inflation of the German mark. The fall in rates following 1923 coincides with the financial recovery in Germany. The available data do not indicate that the influenza epidemic of 1918 exerted much, if any, influence on the tuberculosis mortality. Germany apparently lost approximately 280,000 civilians from tuberculosis, more than probably would have died had the war not occurred. The excess tuberculosis mortality in the civilian population in Germany, due to the war and postwar period 1914-1927, was equivalent to the total tuberculosis mortality in Germany for five years at the rate prevailing in 1928. For every 10.6 German military casualties during 1914 there was one German civilian who died of tuberculosis who probably would not have died had the war not occurred.

Lysis of Tubercle Bacilli in Sputum.—Rosenthal and Dolgopol describe experiments from which they conclude that tubercle bacilli may undergo lytic changes in the sputum if the specimen is allowed to stand for a few days before examination. A certain degree of lysis may occur at room temperature. At 37 C. the lysis becomes evident after ten days, following an initial increase in the number of tubercle bacilli. The optimum

for the lysis is at 48 to 60 C. The concomitant flora of the sputum does not affect the staining ability of the tubercle bacilli. The lytic agent is probably the product of autolysis of the leukocytes.

Delaware State Medical Journal, Wilmington

3: 137-156 (Aug.) 1931

Montaigne and the "Physitions." A. C. Jost, Dover, Del.—p. 137.
Diphtheria in Delaware. C. A. Sargent, Dover.—p. 141.
Treatment of Diphtheria. W. H. Park, New York.—p. 143.
Tularemia. E. F. Smith, Georgetown.—p. 145.
Wassermann and Kahn Tests. R. D. Herdman, Dover.—p. 147.
Progress in the Health Department. A. C. Jost, Dover.—p. 149.

Florida Medical Association Journal, Jacksonville

18: 53-100 (Aug.) 1931

Clinical Consideration of Intravenous Urography. L. Orr, Orlando.—p. 61.
Postoperative Intestinal Ileus. J. R. Wells, Daytona Beach.—p. 65.
Case Reports: Malignancies of Transverse Colon and Sigmoid Colon. C. D. Hoffmann, Orlando.—p. 68.

Johns Hopkins Hospital Bulletin, Baltimore

49: 121-201 (Sept.) 1931

Reflections on Relation of Curriculum to Certain Problems in Medical Education. A. R. Rich.—p. 121
Influence of Dehydration on Phenomena of Anaphylaxis in Guinea-Pigs. M. I. Rubin, Baltimore, and C. E. Kellett, London.—p. 170.
Presentation of Portrait of Dr. Henry M. Thomas. L. F. Barker, Baltimore.—p. 181.
Diabetes Mellitus and Pregnancy. C. H. Peckham, Baltimore.—p. 184.

Diabetes Mellitus and Pregnancy.—From a study of seventeen pregnancies in twelve diabetic women, Peckham concludes that diabetes may become somewhat aggravated during the first two thirds of pregnancy, but a definite improvement is to be expected as the patient approaches term. Death of the fetus in utero may result in an immediate break of the diabetes from control. The course of labor in such patients is not unfavorable and the puerperium seems to present no particular danger. A hypoglycemia during the early puerperium may become evident. The improvement noted during the last part of pregnancy may persist for some weeks or months after delivery. The duration of such improvement is often coincident with lactation, and nursing may be safely continued as long as possible. Toxemia is a frequent complicating factor. The outcome to the child is not unfavorable. Under careful supervision there seems to be no reason why the average diabetic woman should not pass through a restricted childbearing career with a reasonable degree of safety.

Journal of Comparative Neurology, Philadelphia

53: 1-262 (Aug. 15) 1931

Cerebellum of Triturus Torosus. O. Larsell, Portland, Ore.—p. 1.
Amphibian Forebrain: V. Olfactory Bulb of Necturus. C. J. Herrick, Chicago.—p. 55.
Neurofibrillar Structure of Spinal Cord of Cat Embryos Correlated with Appearance of Early Somatic Movements. W. F. Windle, Chicago.—p. 71.
Sensory Components of Spinal Accessory Nerve. W. F. Windle, Chicago.—p. 115.
Innervation of Pia Mater of Spinal Cord and Medulla. S. L. Clark, Chicago.—p. 129.
Correlated Anatomic and Physiologic Studies of Growth of Nervous System of Amphibia: X. Corollaries of Anatomic and Physiologic Study of Amblystoma from Age of Earliest Movement to Swimming. G. E. Coghill.—p. 147.
Further Observations on Components of Myenteric Plexus. S. E. Johnson and M. Palmer, Louisville, Ky.—p. 169.
Further Study of Sympathetic Innervation to Skeletal Muscle: Anatomic Considerations. S. S. Tower, Baltimore.—p. 177.
Data on Relative Time of Formation of Cerebral Ganglions of Amblystoma Jeffersonianum. F. L. Landacre, Columbus, Ohio.—p. 205.
Recovery of Normal Tonus in Course of Regeneration of Cervical Sympathetic Nerve. H. v. Brücke, Baltimore.—p. 225.

Journal of Industrial Hygiene, Boston

13: 233-268 (Sept.) 1931

Butcher's Dermatitis. B. Schwartz, New York.—p. 233.
Study of Dysmenorrhea at Home Office of Metropolitan Life Insurance Company. Ruth E. Wing, New York.—p. 244.
Observations on Working Capacity of Coal Miners in Relation to Atmospheric Conditions. T. Bedford and C. G. Warner, London.—p. 252.
New Instrument for Measuring Cooling Power: Coolometer. W. S. Weeks, San Francisco.—p. 261.

Medical Journal and Record, New York

134: 209-260 (Sept. 2) 1931

Language of Medicine. H. J. Mulford, Buffalo.—p. 209.
Enlarged Prostate: A Plain Talk. W. S. Pugh.—p. 211.
Two Sisters with Keratitis Parenchymatosa. D. W. Montgomery and G. D. Culver, San Francisco.—p. 216.
Acute and Habitual Vomiting in Infants: Five Illustrative Cases. Esther B. Hardisty, New York.—p. 219.
Breast Nutrition vs. Artificial Feeding. O. B. Weinshank and M. L. Furman, New York.—p. 222.
Present Status of Birth Control Movement in England and the United States: Recent Developments. S. A. Knopf, New York.—p. 224.
Lupus Erythematosus Bullosus or Pemphigoides: Two Cases with Discussion of the "Senear-Usher Syndrome." F. Wise, New York. p. 227.
Lupus Erythematosus: Clinical Study with Histopathologic Findings. N. B. Heller, Newark, N. J.—p. 231.
Electrolysis in Skin Disorders: Indications, Contraindications and Technic. G. M. Lewis, New York.—p. 234.
Value of Calcium in Dermatology. F. A. Diasio, New York.—p. 237.
Eczema—The Dyspepsia of the Skin. R. Friedman, Philadelphia.—p. 241.
Practical Therapeutics: New Dye for Control of Mouth and Throat Infection. F. J. Novak, Jr., Chicago, and E. E. Drake, Baltimore.—p. 243.
Historical Medicine: Dietetics of Celsus. W. R. Riddell, Toronto.—p. 247.

Minnesota Medicine, St. Paul

14: 765-878 (Sept.) 1931

Doctor Takes a Hand in Veterans' Relief. C. B. Wright, Minneapolis.—p. 765.
The Saturation Point. N. O. Pearce, Minneapolis.—p. 768.
Paresis and Malaria. G. N. Ruhberg, St. Paul.—p. 779.
Pathology and Pathogenesis of Ocular Melanomas. W. E. Camp, Minneapolis.—p. 784.
American Rite—Tonsillectomy. W. W. Lewis, St. Paul.—p. 790.
Summary of Indications, Technic and Results to Be Expected in Use of Both Artificial and Natural Heliotherapy. E. S. Mariette, Oak Terrace.—p. 793.
Impairment of Vision Following Head Injury. A. E. Smith, Minneapolis.—p. 809.

Nebraska State Medical Journal, Lincoln

16: 337-376 (Sept.) 1931

Recent Advances in Diagnosis and Surgical Treatment of Carcinoma of Colon. F. W. Rankin, Rochester, Minn.—p. 337.
Choice of an Anesthetic. J. M. Willis, McCook.—p. 344.
Roentgenologic Diagnosis of Lesions in Esophagus. A. P. Overgaard, Omaha.—p. 350.
Uses of Digitalis in Heart Failure. P. T. Bohan, Kansas City, Mo.—p. 352.
Mastoid Infections in Children. B. M. Kully, Omaha.—p. 357.
Eustachian Tube. S. G. Zemer, Lincoln.—p. 360.
Sketch of Life and Work of Leonardo da Vinci. C. M. Wilhelmj, Omaha.—p. 362.
Diagnosis of Hyperthyroidism with Especial Reference to Basal Metabolic Rate: Case Reports. B. R. Farner, Norfolk.—p. 365.

New Jersey Medical Society Journal, Orange

28: 539-602 (July) 1931

General Practitioner and Obstetrics. S. A. Cosgrove, Jersey City.—p. 545.
Consideration of Causes of Diarrhea. E. W. Rodman, Beverly.—p. 548.
Treatment of Bright's Disease. T. Floyd, New York.—p. 552.
Circulatory Disturbances in Extremities of Diabetics: Their Recognition. D. W. Kramer, Philadelphia.—p. 560.
Common Diseases of Oral Mucosa. B. M. James, Newark and Montclair.—p. 563.
Diabetes Mellitus and Thrombo-Angiitis Obliterans in Same Patient. H. S. Davidson, Atlantic City.—p. 570.
Review of Recent Literature on Thrombo-Angiitis Obliterans with Report of Advanced Case. M. Gross, Long Branch.—p. 571.

28: 603-678 (Aug.) 1931

Cult of Asklepios. W. B. Stewart, Atlantic City.—p. 603.
Factors in Early Diagnosis and Treatment of Fractured Skulls. H. W. Jack, Camden.—p. 608.
Occupational Dermatitis. J. E. Kiley, Newark.—p. 613.
Prevention of Measles in Private Practice. G. Heller, Englewood.—p. 617.
Thrombosis and Embolism. F. W. Bancroft, New York.—p. 619.
Statistical Study of Diphtheria in Newark, with Especial Reference to Cases Occurring After Schick Test of Toxin-Antitoxin Immunization. J. W. Gardam, Newark.—p. 626.
Development of a Postmortem Service. A. Yaguda, Newark.—p. 636.
Continued Education of the Doctor. J. A. Hartwell, New York.—p. 639.
What the Present Day Public Thinks of Medical Profession. J. C. Doane, Philadelphia.—p. 648.
Noises of Civilization and Their Evil Effects. W. A. Wells, Washington, D. C.—p. 653.
Danger Ahead, in the Cathartic Habit. H. S. Read, Atlantic City.—p. 660.

New Orleans Medical and Surgical Journal

84: 163-226 (Sept.) 1931

Burden of Syphilis and Gonorrhea in New Orleans. W. Clarke, New York.—p. 163.
Appraisal of County Health Work Based on Reduction of Morbidity and Mortality. F. J. Underwood, Jackson, Miss.—p. 174.
Some of the Problems Challenging Doctors and Health Officers in Mississippi. J. T. Googe, Meridian, Miss.—p. 178.
Rôle of General Practitioner in Modern Medicine. W. H. Anderson, Booneville, Miss.—p. 180.
Chaulmoogra Oil in Treatment of Arthritis. P. A. McIlhenny, New Orleans.—p. 182.
Undulant Fever: Public Health Problem. P. A. Kibbe, New Orleans.—p. 187.
Tattooing: History, Pathology and Methods of Removal. P. D. Abramson, Shreveport, La.—p. 191.

New York State Journal of Medicine, New York

31: 1065-1110 (Sept. 1) 1031

Management of Ocular Injuries. N. S. Weinberger, Sayre, Pa.—p. 1065.
Rôle of Tonsils and Nasal Accessory Sinuses in Nephritis. A. Palmer, New York.—p. 1069.
Herpes Zoster and Varicella. E. F. Traub and J. A. Tolmach, New York.—p. 1072.
So-Called Acute Abdomen from Standpoint of General Practitioner and Internist. C. W. Greene, Buffalo.—p. 1075.
Physical Therapy in Infantile Paralysis. R. Kovacs, New York.—p. 1078.
Tinnitus. E. S. Ingersoll, Rochester.—p. 1081.
Clinical Aspects of Phosphaturia. L. H. Baretz, Brooklyn.—p. 1084.
Laboratory Aids in Diagnosis of Undulant Fever. Ruth Gilbert and Marion B. Coleman, Albany.—p. 1087.
Stramonium in Chronic Epidemic Encephalitis. Patricia Steen, Kings Park.—p. 1090.

Ohio State Medical Journal, Columbus

27: 681-760 (Sept.) 1931

Anemia. A. B. Brower, Dayton.—p. 701.
Exstrophy of Bladder with Transplantation of Ureters Into Rectum. C. C. Higgins, Cleveland.—p. 705.
Laryngoscopy, Bronchoscopy and Esophagoscopy. J. D. Fouts, Dayton.—p. 708.
Maternal Toxemia and Infant Mortality. T. Miller and F. A. Snyder, Cleveland.—p. 711.
Tenosynovitis. H. R. Conn, Akron.—p. 713.
Mitral Stenosis Following Infectious Mononucleosis. R. W. Bradshaw, Oberlin.—p. 717.

Public Health Reports, Washington, D. C.

46: 1981-2040 (Aug. 21) 1931

Public Health Service in Knox County, Tenn., Fiscal Year July 1, 1929-June 30, 1930. J. W. Mountin.—p. 1981.
Technic for Adjustment of *p*H of Hanging Drop Tissue Cultures. W. R. Earle.—p. 1998.

46: 2093-2159 (Sept. 4) 1931

Expansion of Investigations on Tick-Borne Diseases by United States Public Health Service. R. R. Spencer.—p. 2097.
Survey of Work of Employees' Mutual Benefit Associations. D. K. Brundage.—p. 2102.

South Carolina Medical Assn. Journal, Greenville

27: 193-215 (Aug.) 1931

Early Diagnosis of Chronic Glaucoma. J. W. Jervey, Jr., Greenville.—p. 196.
We Esaus. C. W. Evatt, Greenville.—p. 199.
Asthma, Hay Fever and Other Allergic Conditions. F. M. Routh, Columbia.—p. 202.

Southwestern Medicine, Phoenix, Ariz.

15: 343-396 (Aug.) 1931

Foreign Bodies in Air and Food Passages. W. E. Vandevere, El Paso, Texas.—p. 343.
Bronchoscopic Diagnosis and Treatment, Including Foreign Bodies. C. W. Brown, San Diego, Calif.—p. 346.
Prenatal Care. R. K. Smith, Tucson, Ariz.—p. 355.
Birth Injuries in the New-Born: Especial Reference to Intracranial Hemorrhage. F. B. Sharp, Phoenix, Ariz.—p. 357.
Sudden Death After Spinal Anesthesia (Sensitization Phenomenon and Adrenalin Suspected as Being Cause; Case Reported in Which Convulsion Followed Use of Adrenalin). O. H. Brown and L. C. Barlow, Phoenix, Ariz.—p. 363.
Tetanus Following Hemorrhoidectomy. E. E. Priego, Nogales, Sonora, Mexico.—p. 364.
Trauma to Kidney. A. W. Multhauf, El Paso, Texas.—p. 365.
County Health Unit. J. R. Scott, Albuquerque, N. M.—p. 366.
Sanitation in Automobile Camps. P. S. Fox, Santa Fe, N. M.—p. 369.
Summary of Malaria Control Work in Dona Ana County, New Mexico. C. W. Gerber, Las Cruces, N. M.—p. 370.

Surgery, Gynecology and Obstetrics, Chicago

53: 273-432 (Sept.) 1931

Lesions of the "Isthmus" (Pars Interarticularis) of Laminae of Lower Lumbar Vertebrae and Their Relation to Spondylolisthesis. F. A. Chandler, Chicago.—p. 273.
*Experimental Obstruction of Terminal Duodenum and Ileum: Importance of Blood Chemical Changes in Causing Death. R. Elman and A. F. Hartmann, St. Louis.—p. 307.
*Anomalies of Intestinal Rotation: Two Cases. H. E. Haymond and L. R. Dragstedt, Chicago.—p. 316.
*Effect of Anesthesia on Blood Sugar Content: Experimental Investigation. E. C. Mekie, Edinburgh, Scotland.—p. 329.
*Etiology of Endometrial Hyperplasia. J. C. Burch, W. L. Williams and R. S. Cunningham, Nashville, Tenn.—p. 338.
Surgical Management of Intrathoracic Goiter. F. H. Lahey, Boston.—p. 346.
Modification of Rotation Arthrodesis of Knee (Roeren). J. E. Milgram, Iowa City.—p. 355.
Carcinoma of Both Kidneys: Case with Review of Literature on Multiple Primary Malignant Tumors. H. L. Sanford, Cleveland.—p. 360.
Modified Technic for Spinal Fusion. A. Gibson, Winnipeg, Canada.—p. 365.
Correction of Deformity as Routine Procedure Before Stabilization Operations of Lower Extremity. E. Hauser, Chicago.—p. 369.
*Thyroidectomy for Thyrotoxicosis in the Young: Twenty-Six Cases Between Ages of 8 and 16 Years. E. I. Greene and J. M. Mora, Chicago.—p. 375.
Lumbosacral Spina Bifida Occulta. R. J. Dittrich, Wichita, Kan.—p. 378.
Results in Relation to Site of Amputation in Thrombo-Angiitis Obliterans. C. F. Burke and H. W. Meyerding, Rochester, Minn.—p. 389.
Necrotic Edema of Gallbladder. A. S. Lobingier, Los Angeles.—p. 395.

Obstruction of Duodenum and Ileum.—In an attempt to evaluate the blood chemical change as a factor in causing death in high and low intestinal obstruction, complete fistula or obstruction was created by Elman and Hartmann in six dogs at the terminal duodenum, and in seventeen at the ileocecal junction. Changes in blood serum, concentration of chloride, carbon dioxide content, protein, inorganic phosphate, lactic acid, total base, water content, and nonprotein nitrogen were followed, and the following conclusions were drawn: 1. The principal cause of the rapid death which follows high obstruction (or fistula) in the terminal duodenum is to be found in the chemical changes in the body fluids, resulting primarily from loss of gastro-intestinal secretions, and, secondarily, from circulatory and renal insufficiency due to dehydration. 2. Death following low (ileocecal) intestinal obstruction is not, except in rare instances, due to such changes. It is not necessarily due, moreover, to gangrene or necrosis of the obstructed intestine. 3. Blood chemical examination cannot be relied on as a measure diagnostic either of the site or presence of intestinal obstruction. Its chief value is that it enables one to determine the extent of loss of gastro-intestinal secretions, and the adequacy of treatment designed to restore such loss.

Anomalies of Intestinal Rotation.—Haymond and Dragstedt report two cases of anomaly of intestinal rotation. One case which formerly would probably have been considered an intra-abdominal hernia was more logically explained on the basis of malrotation of the midgut loop in the second stage of rotation. A case of chronic volvulus neonatorum is described. Reports of thirty-three additional cases (including a case observed by the authors) are collected from the literature, bringing the total number of cases of anomaly in the second stage of rotation to 100.

Effect of Anesthesia on Blood Sugar Content.—Mekie describes experiments on rabbits, from which he concludes that ether anesthesia is associated with hyperglycemia. The rise in the blood sugar is due to mobilization of hepatic glycogen. The various mechanisms possible are discussed and exclusion of sympathetic and vagal stimulation or hypersecretion of the suprarenals suggests that the action of the ether is directly on the liver cells.

Etiology of Endometrial Hyperplasia.—According to Burch and his associates, both the estrin hormone and the corpus luteum hormone produce a definite and characteristic reaction on the endometrium. It is possible in cases in which mixed effects are obtained to determine by means of histologic sections which is predominant. The microscopic appearance of the endometrium obtained from cases of Swiss cheese hyperplasia are similar to those found in animals which have been injected with extracts of placenta. Material obtained from the

follicle cysts of human cases of hyperplasia, when injected into mice and rats, produced estrus. The changes in the uterus of each case were similar in many respects to those found in the uterus of the experimental animals receiving the fluid from that case.

Thyroidectomy for Thyrotoxicosis in the Young.—Greene and Mora give a report of twenty-six cases in which thyroidectomy was done for thyrotoxicosis, the patients being children between the ages of 8 and 16 years. These cases are a part of a series of 1,200 consecutive toxic goiter patients who were subjected to operation. There were twenty-two girls and four boys. The chief symptoms and signs were tachycardia, nervousness, goiter, exophthalmos, tremor, loss of weight, palpitation, enlargement of the left side of the heart, irritability, weakness and restlessness. The symptoms correspond closely with those manifested in adults. The average preoperative systolic and diastolic blood pressure readings were 132 and 65 mm., respectively. The postoperative readings were 108 and 72 mm. The average pulse pressure dropped from 67 to 36 mm. after operation. The average preoperative basal metabolic rate was plus 34.6. The average postoperative reading was minus 6.2. All of the glands examined microscopically showed varying degrees of hyperplasia and hypertrophy. One-stage thyroidectomy was done in every instance. There were no deaths in this series.

Virginia Medical Monthly, Richmond

58: 353-422 (Sept.) 1931

Question of Mortality in Acute Appendicitis. H. B. Stone, Baltimore.—p. 353.
Practicing Physician and Adult Education. G. Baughman, Richmond.—p. 356.
Visual Fields in Toxic Blindness, Due to Foci in Mouth and Nose. C. P. Jones, Newport News.—p. 361.
Obligations of Hospitals to Interns and, Reciprocally, Obligations of Interns to Hospitals. G. T. Baughan, Washington, D. C.—p. 363.
Diabetic Coma and General Practitioner. G. H. Wolfe, Abingdon.—p. 365.
Prognosis in Eclampsia. M. P. Rucker, Richmond.—p. 369.
Management of Normal Labor in Home. J. L. Hamner, Mannboro.—p. 376.
Encephalography as Aid in Diagnosis of Brain Tumors: Case. H. R. Masters, Richmond.—p. 378.
Sprue in Southwest Virginia: Case. R. D. Campbell, Saltville.—p. 380.
Eugenic Sterilization. J. R. Gill, Petersburg.—p. 382.
Sporotrichosis: Case in Virginia. F. W. Shaw, Richmond, and R. Kinbrough, Norfolk.—p. 384.
Report of Eight Consecutive Cases of Ruptured Gastroduodenal Ulcers. G. W. Horsley, Richmond.—p. 386.
Agranulocytosis: Case with Three Relapses. C. Goldenberg, Washington, D. C.—p. 391.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

39: 649-728 (Sept.) 1931

Osteomyelitis of the Jaw. J. H. Woolsey, San Francisco.—p. 661.
Cinch Shortening Loop in Surgery of Exta-Ocular Muscles. R. O'Connor, Oakland, Calif.—p. 670.
Riedel's Struma in Contrast to Struma Lymphomatosa (Hashimoto). A. Graham, Cleveland.—p. 681.
Postoperative Hypothyroidism. R. D. McClure and A. B. McGraw, Detroit.—p. 690.
Clinical and Pathologic Study of Carcinomatous Gastric Ulcer with Particular Reference to Grading of Malignancy. W. H. Bueermann, Portland.—p. 698.

West Virginia Medical Journal, Charleston

27: 385-432 (Sept.) 1931

Medical Aspects of Jaundice. R. C. Blankinship, Madison, Wis.—p. 385.
Adenomatous Goiter. W. C. Kappes, Huntington.—p. 392.
Industrial Eye Injuries. A. J. White, Charleston.—p. 394.
Fungus Infection of Feet, Hands and Groins. H. T. Phillips and W. J. Morginson, Wheeling.—p. 401.
Low Mortality of Appendicitis. O. C. Cox, Washington, D. C.—p. 406.
Treatment of Diabetes Mellitus. H. G. Thompson, Charleston.—p. 407.
The Quest. May M. Malongy, Fairmont.—p. 410.

Wisconsin Medical Journal, Madison

30: 706-787 (Sept.) 1931

Immunization of Preschool Child Against Diphtheria by Use of Toxoid. A. B. Schwartz and F. R. Janney, Milwaukee.—p. 719.
Endocervicitis and Erosions: Their Treatment by Electrosurgical Methods. W. E. Ground, Superior.—p. 722.
Cancerous and Precancerous Lesions of Skin: Diagnosis and Management. C. J. White, Chicago.—p. 726.
The Traveling Venereal. S. J. Silbar, Milwaukee.—p. 729.
Medical Social Work for Sanatoriums. M. Bean, Milwaukee.—p. 731.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Radiology, London

4: 421-476 (Sept.) 1931

Radiology of Accessory Nasal Sinuses: New Standardized Technic for Exact Projection of All Accessory Nasal Sinuses, Together with Demonstration of Fluid Levels. H. G. Hodgson.—p. 421.
Simple and Accurate Method of Radiographic Pelvimetry. L. A. Rowden.—p. 432.
Hydatid Disease in England. J. F. Brailsford.—p. 440.
Uniformly Impressed Prints from Contrasty Negatives. A. Orley.—p. 451.
Secondary Radiation Therapy: Part II. Biologic Aspects. H. Burrows.—p. 454.

Glasgow Medical Journal

35: 137-200 (Sept.) 1931

What Surgery Offers in Cancer of Stomach. G. G. Turner.—p. 137.
Constancy of Cultural Reactions of Streptococci on Holman's Carbohydrate and Blood Agar Mediums: A Contribution to Classification of Streptococci. Margaret S. L. McCash.—p. 163.

Journal of Tropical Medicine & Hygiene, London

34: 301-372 (Sept. 15) 1931

Bearing of Tropical Experience on Views of Pathogenesis of Rheumatic Fever. J. T. Clark.—p. 301.
On Chemical Nature of "Pellagra Toxin" and Discovery of Thiosulphate Treatment of Pellagra. I. Sabry.—p. 303.
Some Aspects of Colon Group of Organisms, with Especial Reference to Water Supplies of Trinidad. J. L. Pawan.—p. 310.

Lancet, London

2: 513-564 (Sept. 5) 1931

*Mechanism of Inflation of Lungs: Influence of Deflation on Postoperation Complications. C. Briscoe.—p. 513.
Albuminuria Complicating Pregnancy. G. F. Gibberd.—p. 520.
Etiologic Importance of Elementary Bodies in Vaccinia and Fowl-Pox. J. C. G. Ledingham.—p. 525.
Infantile Hypertrophic Pyloric Stenosis: Symptomatology, Treatment and Prognosis. C. MacLeod.—p. 526.

Mechanism of Inflation of Lungs.—Briscoe strongly deprecates methods which aim at expanding the deflated lung in the early stages after operation. In the great majority of cases no effect of the deflation is perceptible, and the means suggested are unpleasant; when symptoms arise the procedure on theoretical grounds is inexpedient and practically it is detrimental. Points to be recommended are: 1. After operation the sitting-up posture assists respiration because gravity helps expiration by allowing the thorax to descend, counteracting the inspiratory elevation of the scalene and intercostal muscles and obviating the necessity for abdominal muscle action for this purpose. This is especially true of the type with thoracic breathing. The individual should be allowed to choose the position which is comfortable, and be encouraged to change frequently. 2. Bandages should not be too tight above the level of the umibilicus. It is here that abdominal protrusion in diaphragmatic inspiration is greatest in degree. On the other hand, a tight bandage supports the incised muscle. It is largely a question for the individual patient and the type of breathing he has developed. 3. Movements of the head and arm and of all sorts, as soon as these no longer cause pain, should be encouraged as inducing contraction in abdominal muscles and so relieving muscle monotony. The contraction of the diaphragm is increased, its level is lowered, and a step is taken toward expansion of the lower lobes. 4. When nonviscid sputum is present: (*a*) the mildest symptom is half-hearted coughing eighteen hours or more after operation, sometimes as much as every half minute, with no expectoration. Eventually some mucus is expectorated, usually after four or five days. This has accumulated in the "test-tube bronchi." There is not enough energy to get air behind it. As a rule, this does not require treatment. (*b*) If the condition is troublesome, the patient should be instructed to breathe in as slowly and deeply as possible and then to give a short, sharp expiration, which produces expectoration. During this effort he should support the lower thorax with a hand in each lower axilla, the nurse supporting the abdomen with her hand on the bandage over the area of incision. (*c*) After the third or fourth day, in addition, he may try gently turning into such a position that gravity helps the mucus to run out of the bronchus into the trachea,

where it can be brought up. (*d*) If pyrexia is present and the sputum is purulent instead of mucoid, a creosote inhaler should be employed, the inhaler to be worn as continuously as possible. The success of this is dependent on the manner in which it is introduced, on the instruction that deep breathing is contraindicated, and on seeing that the face is not burned by the creosote. 5. Should the temperature rise after the lapse of twenty-four to forty-eight hours with respiratory distress, the sputum will at first be scanty and viscid, and the cough irritating and nonproductive. Treatment should chiefly be directed to rendering the sputum liquid and easily expectorated. Most important is the rapid administration of alkalis well diluted, every hour or two hours until the urine is alkaline, and of medicated vapor inhalants and such anodynes as are safe. In the common type of condition, beginning on the second or third day the temperature will be down and expectoration easy, though the cough is still painful on the fourth or fifth day. 6. When more severe, the infection may be spread to deeper parts. The cough and associated deeper respirations expand the lung and fresh areas are infected. Hence arise bronchiolitis, bronchopneumonia, pneumonia, and late patchy pleurisy, with the usual sequelae. Treatment is such as is usually employed for these conditions. The author has not seen cases of such severity as to require that the bronchial contents should be removed by mechanical means. The upper lobes alone are quite capable of coping with the respiratory requirements when at rest. The distress of the collapse attack is readily relieved in a few minutes by controlling the movement of the side affected, as is the pain in pleurisy. A broad tape with a spring inserted is most efficient. The pain on coughing is not extinguished in either of these conditions, and for the same reason. A septic pleural effusion with its consequences may, of course, develop in pleurisy following operations, as in other forms of pleurisy, and requires similar treatment.

2: 565-616 (Sept. 12) 1931

Precancerous Lesions of Alimentary Tract. M. J. Stewart.—p. 565.
*The Poisoning Appendix. J. McDonnell.—p. 572.
*Albuminuria Complicating Pregnancy. G. F. Gibberd.—p. 576.
Antirachitic Value of Irradiated Yeast. S. K. Kon.—p. 579.
*Insulin and Preservative: Note on Effect of Insulin Solutions of Varying Reaction on Viability of Staphylococci. P. Hartley.—p. 582.
Observations on Production of Antipoliomyelitis Serum in Horses and Distribution of Antibody Among Serum Fractions. R. W. Fairbrother and W. T. J. Morgan.—p. 584.

The Poisoning Appendix.—McDonnell presents the results of investigations which suggest that the views on appendicitis should be recast, and that, instead of visualizing appendicitis as acute or subacute, to be followed by chronic disease, one should realize that the first evidence of trouble in the appendix is made manifest by nebulous symptoms which, in the aggregate, cannot be accounted for by any other than a toxemic origin. Hence one must view disease of the appendix as primarily a poisoning, with subacute, acute or chronic sequelae. This opinion is diametrically opposed to that of A. J. Walton, who doubts the existence of chronic appendicitis, apart from remainders left over from an acute attack, either as the cause of upper abdominal symptoms or as causing pain in the right iliac fossa. The "poisoning appendix" gives a physical sign which has hitherto not been described—viz., increased resistance of the upper segment only of the right rectus, in an otherwise normal abdomen. This increased resistance is easily appreciated but does not in any way simulate the form of resistance found in epigastric lesions. This sign tends to merge into that mentioned by W. Trotter, who pointed out that a definite difference in the tension of the two recti is probably the best physical sign of chronic appendicitis, but it differs in that the lower two segments of the rectus are generally unaffected. The roentgen evidence in these cases can be summed up in the expression "a nonfunctioning appendix"; i. e., an appendix which, on account of some pathologic changes, will not fill or, on the contrary, will not empty within the somewhat elastic time limit accepted as being the rate of filling or emptying of normal appendixes; or one of which the outline or limitation of movement is due to obstruction either from within or from without; e. g., concretions, constrictions, kinks or adhesions. This evidence conforms in detail with that already described by Friedman in chronic appendicitis. In addition, however, emphasis should be laid on the importance of finding calcareous lymph nodes round the ileocecal region. There has been much controversy as to the origin of calcareous lymph nodes in the neighborhood of the cecum. In this group of cases these appear to have no origin other than that due to inflammation from the area drained by these lymph nodes; out of eighteen cases with symptoms of poisoning and a nonfunctioning appendix, thirteen presented this lymph node involvement. Other causes having been eliminated, a poisoning appendix is a nonfunctioning appendix with a toxemic symptomatology for which the only treatment is appendectomy. Every care must be taken not to condemn a patient to an operation on the basis of a nonfunctioning appendix alone if maximum beneficial results cannot be expected. It is particularly necessary to be on guard with female patients, as they are subject to a complexity of symptoms, due to manifold forms of endocrine dysfunction, which closely simulate a picture of toxic origin. The clinical picture is one of symptoms arising from a condition of either slow general toxicity—e. g., lassitude, general malaise, loss of energy—or one of a more advanced toxemic state showing pyrexia, with the additional complication of vomiting, should a subacute local inflammation of the peritoneal tissues have occurred. None of the author's patients have ever exhibited pain, tenderness or discomfort in the right iliac fossa, except when pressure has been applied to a full cecum during roentgen examination. The usual and various sources of toxins must be eliminated. Having excluded dental and tonsillar sepsis, and any other form of toxin, one is justified in assuming that the toxin arises in the alimentary tract. Detailed investigation of the tract finally allocates the blame. A general toxemic state caused by a fault in the intestinal tract can be eradicated by early detection and removal of the appendix. All surgeons and physicians have seen many cases of apparently incomprehensible cure when symptoms have pointed to no definite pathologic lesion and when in desperation the appendix has been removed. Recognition of the poisoning appendix should considerably lower the surgical mortality in cases of appendectomy, for a large percentage of patients would be operated on before the predominance of peritoneal symptoms. It should also negative the disrespect with which physicians view operations for chronically diseased appendixes; a disrespect begotten of the indisputable fact that in a large percentage of cases the patients do not appear to have derived any benefit from the operations. The probable explanation of this absence of beneficial results is that the patients' systems have become so impregnated with the by-products of poisoning from the appendix as to render removal of the cause incapable of obliterating the effects. Investigations into the histories of patients with acute appendicitis have invariably shown that the patients complained of some phase of general malaise—which on close analysis would evidence toxemic origin—over a period, either long or short, before the onset of acute symptoms. Acute appendicitis must therefore be regarded as a preventable calamity.

Albuminuria Complicating Pregnancy.—In view of the unsatisfactory results that are liable to follow albuminuria complicating pregnancy, Gibberd emphasizes the necessity for more whole hearted treatment. The futility of basing a treatment on mere speculations as to the etiology of the disease is discussed, and a treatment the rationale of which depends on what is known of the late results is outlined. This treatment aims primarily at protecting the kidneys against the "toxemia," and it has as its basis, rest, protein-free diet, and early induction of labor. These three measures are discussed at length, and although each is a well recognized method of treatment, a plea is made for their more conscientious application, in an attempt to improve the late results, which are at present so unsatisfactory.

Insulin and Preservative.—According to Hartley, insulin solutions, with the acidity commonly given to them, have a germicidal action even when no added preservative is present. A slight change in the reaction toward the alkaline side not only destroys this germicidal action but converts the solution into a culture medium if no preservative is present. The usual proportion of phenolic preservative is still effectively germicidal under such conditions. Opalescence or turbidity of the solution is not an adequate indication of such change of reaction. Solutions can be made sufficiently alkaline as to remain clear and still support the growth of cocci.

Archives des Maladies du Cœur, etc., Paris

24: 401-464 (July) 1931

*Arrhythmia: Intravenous Quinidine Therapy. T. Padilla and P. Cossio. —p. 401.
Id.: Pulsus Alternans. N. Kisthinios and D. M. Gomez.—p. 410.
Pseudo-Aneurysm of Heart: Pericardiac Symphysis. S. Mentl.—p. 417.

Arrhythmia: Intravenous Quinidine Therapy.—Padilla and Cossio describe their experience in the treatment of two patients with supraventricular paroxysmal tachycardia and two patients with auricular flutter. They discuss the results and conclude that for the safe intravenous administration of quinidine the procedure should be as follows: For intravenous injection, 0.005 Gm. of quinidine sulphate is dissolved in 10 cc. of sterile physiologic solution of sodium chloride. The injection should be made slowly with the patient in a horizontal position. If the dose is not sufficient the injection may be repeated after a certain time, and the dose increased to 0.15 Gm. for every 10 Kg. of body weight. When the desired result is attained, the treatment may be continued orally. Because of its harmlessness and its effectiveness, intravenous quinidine therapy is indicated in all cases of prolonged paroxysmal tachycardia which do not yield to the usual therapeutic measures, in order to arrest the attacks suddenly and reestablish the normal rhythm. Intravenous quinidine therapy is also indicated in auricular flutter, particularly the paroxysmal form, to diminish the ventricular frequency due to an increase in the auriculoventricular conduction.

Gynecologie et Obstétrique, Paris

23: 481-578 (June) 1931

*Ectopic Pregnancy and Intraperitoneal Inundation of Genital Origin. G. Muller and C. Oberling.—p. 481.
Reaction of Deviation of Complement in Gonorrhea in Women. L. Izwojnicka and T. Zawodzinski.—p. 496.
Treatment of Puerperal Infection by Fixation Abscess. B. Sorrentino. —p. 511.
*New Method for Temporary Sterilization of Women. P. Morhardt.—p. 518.

Ectopic Pregnancy and Intraperitoneal Inundation of Genital Origin.—Muller and Oberling find an increase in the number of cases of ectopic pregnancy for the period from 1925 to 1930. They believe that this is parallel to the increase of gonorrhea. Genital inflammation as well as abnormal tubal peristalsis, as a result of irregularities in the sympathetic system and the ovarian hormone secretion, have been suggested as causes of ectopic pregnancy. Many clinical and histologic examinations convince the authors that salpingitis is not one of the inflammatory sequelae. Ectopic pregnancy is more common than is supposed. The authors discuss ten cases under the headings of tubal rupture, pelvic hemorrhage and tubal abortion, including examples of expulsion of decidua, hematocele formation, torsion of gravid uteri and bilateral tubal pregnancy. They summarize some of the recently recognized symptoms thus: (1) blue sign of Cullen, never observed except in the case of a transparent abdominal wall; (2) referred pains in the right hypochondrium or right shoulder caused by irritation, through extravasation, of the phrenic nerve in the diaphragm; (3) vesical symptom of Herzfeld-micturition at the moment of rupture, and (4) an important sign in locating a peritoneal inundation, namely, a piercing pain at the level of the culdesac on deep palpation (this is also observed in acute gonococcic pelvic peritonitis). When in doubt, one has recourse to the exploratory tapping of the Douglas culdesac. The authors believe that a detailed anamnesis should serve as a basis for clinical and especially laboratory research. They believe that surgical intervention is indicated even in cases in which the diagnosis is not absolutely certain.

New Method for Temporary Sterilization of Women.—Morhardt uses a method of sterilization which consists of crushing the fallopian tube at its extremity and applying two parallel sutures 10 mm. apart. The muscularis and the mucosa are destroyed and transformed into a fibrous cord. The physiologically essential part of the tube is not touched. However, difficulties have been encountered in making the tube permeable again. The author recommends the following method. He uses an electrical bistoury to resect the abdominal extremity of the fallopian tube. The edges are then sutured end to end or implanted into the uterus. The second intervention is both simple and brief. Sterilization performed in this manner does not prolong appreciably the small cesarean operation (after the third month) and there is no loss of blood. It could be done at the same time as a major operation whereas the other procedures necessitate a second intervention which keeps many fearful or negligent patients from taking advantage of them.

Presse Médicale, Paris

39: 1213-1228 (Aug. 15) 1931

Kala-Azar in France. P. Giraud.—p. 1213.
*Diathermy in Inflammation of Pelvic Region and Mammary Glands. D. Fainsilber and M. Portret.—p. 1214.

Diathermy in Inflammation of Pelvic Region and Mammary Glands.—Fainsilber and Portret report the results they obtained with diathermy in fifty-six cases of vaginismus, cervicitis, endocervicitis, metritis, perimetritis and adnexitis. They conclude that their observations make evident the efficiency of diathermy not only in gynecology but also in inflammatory infections of the mammary glands. In the latter, diathermy not only avoids compression of the breast and interruption of nursing but stops pain, congestion and suppuration. Moreover, the effect of diathermy treatment is manifested without delay in inflammatory mammary infections, yet it is without influence on the growth of malignant tumors. The treatment may be utilized in the differential diagnosis between mastitis and neoplasms. In genital infection in which the acuteness does not necessitate urgent intervention or in a slowly developing mammary lesion of questionable prognosis, one may use diathermy before running the risk of operation.

Schweizer Archiv. f. Neurologie u. Psychiatrie, Zurich

27: 193-429 (No. 2) 1931

Traumatic Injury of Extrapyramidal Apparatus. R. Bing.—p. 193.
Flight of Ideas. L. Binswanger.—p. 203.
Regression Phenomena of Fibrous Glia and Its Relation to Pseudocalcified Concrements. G. Biondi.—p. 218.
*Efficacy of Insulin in Combat of Abstinence Symptoms Following Sudden Withdrawal of Morphine. F. Braun.—p. 226.
History of International Neurologic Convention in Berne. C. Dubois. —p. 234.
Scientific Character of Psychoanalysis. H. Flournoy.—p. 241.
Prognosis in Psychiatric Practice: Its Application in Schizophrenia. O. L. Forel.—p. 250.
Pathologic Anatomy of Epidemic Encephalitis. E. Frey.—p. 259.
Case of Institutional or "Defiance" Psychosis. O. Hinrichsen.—p. 278.
Changes in Form of Pupils in Commotio et Contusio Cerebri. E. Katzenstein.—p. 286.
Topography of Histologic Lesions of Senile Brain. C. Ladame and F. Morel.—p. 301.
Results of International Inquiry on Position of Neurology in Medical Instruction. M. Minkowski.—p. 311.
*Anterior Lobe of Hypophysis and Growth. P. von Monakow.—p. 321.
Psychiatric Indications for Interruption of Pregnancy. W. Morgenthaler. —p. 328.
Acute Benign Lymphocytic Meningitis. F. Naville.—p. 340.
Psychogenic Origin of Physical Troubles in Neurasthenia. R. de Saussure.—p. 348.
Pathogenesis of Periodic Mental Disturbances. J. E. Staehelin.—p. 354.
Pathophysiologic Problems of Schizophrenia. H. Steck.—p. 361.
Regularity in Psychic Processes. Charlot Strasser.—p. 373.
Development of a Psychotic Child. M. Tramer.—p. 383.
Evaluation of Time Factor in Neuropathology. O. Veraguth.—p. 393.
Peculiar Cerebral Disturbances During Childhood. K. M. Walthard.—p. 402.
*Neurotropism of Large Groups of Substances Used in Modern Industry. H. Zangger.—p. 413.
Probable Relation of Certain Dyskinesias, Especially of Dystonic Dysbasias and of Bradykinesia to Nervous Conduction and Time Factor. H. Brunschweiler.—p. 417.

Insulin for Combating Symptoms Following Sudden Withdrawal of Morphine.—Braun directs attention to a new method for treatment of morphinism, which was first recommended by Sakel in the *Deutsche medizinische Wochenschrift* (**56:**1777 [Oct. 17] 1930; abstr. THE JOURNAL, Jan. 3, 1931, p. 78). He modified the method somewhat in that he administered smaller doses of insulin than Sakel, who gave daily doses up to 80 units for six or eight days. The author gives six case histories of persons who had been addicts for several years. On the basis of the favorable results which he obtained in these cases he recommends the treatment. He stresses that the insulin cure must of course be followed by psychotherapy but that the latter is less difficult because the insulin treatment effects a complete change in the patient.

Anterior Lobe of Hypophysis and Growth.—Von Monakow points out that the concurrence of acromegaly and of adenoma of the hypophysis, observations in some cases of gigantism and of dwarfishness, and animal experiments with extirpation and implantation of hypophyseal tissues indicate a relationship between the anterior lobe of the hypophysis and the process of growth. However, in human beings there is rarely an opportunity to observe the influence of hypophyseal preparations on the growth process. Consequently the author feels justified in reporting the clinical history of a boy with infantilism and mongolism. At the age of 6 the boy showed the development of a child aged 3. Under the influence of thyroid preparations the development improved somewhat, but later the preparations became less effective, and at the age of 14, when the boy showed a development comparable to that of a child aged 9, administration of preparations of the anterior lobe of the hypophysis was begun. The extract had been prepared from the hypophysis of growing animals. Medication with this preparation had the effect that a rapid growth set in. Roentgenoscopy of the bones of the hand proved not only that the boy grew in height but that the skeleton also matured. That the hypophyseal preparation was the actual cause of the more rapid growth was proved by the observation that when medication with it was discontinued for several months the growth stopped and did not set in again until the hypophyseal preparation was again administered. The sexual characteristics developed more rapidly under the influence of the hypophyseal preparation. They were somewhat in advance of the general development; however, the mental development did not advance satisfactorily. At the age of 17 the boy was barely able to make the grade of boys aged 10 or 11 years. In the conclusion the author points out that in spite of the good results obtained with the preparation of the anterior lobe of the hypophysis, this case report does not permit the conclusion that the infantilism was of hypophyseal origin, for the normal appearance of the sella did not indicate a hypophyseal disturbance. Moreover, the fact that normal rats show gigantism following implantation of hypophyseal tissues indicates that even the normal growth process can be abnormally increased by the hypophysis, and this also proves that it is advisable to be cautious with conclusions ex juvantibus.

Neutropism of Substances Used in Modern Industry.—Zangger points out that it is necessary to investigate the toxicologic properties of many chemical substances that are employed in modern industry as solvents, for diluting purposes, for cleaning; as additions to paints, to lacquers, to glues and to putties; for protection against rust; also in toilet articles, in vermicides, in fire extinguishers and in refrigerators. The chemical character of many of them is such that they have an affinity to lipoids and to other fatlike substances, and consequently their chronic influence may have an injurious effect on the nervous system and on protoplasmic organs such as the kidneys, suprarenals, liver, ovaries and testes. Some of the substances are absorbable by the skin as well as by the respiratory apparatus. The author points out that there are still great gaps in toxicologic knowledge. It is as yet not definitely known how much of the chronically absorbed substances is retained by the organism and how the toxic effects differ in various persons.

Annali Italiani di Chirurgia, Naples

10: 845-1006 (Aug. 31) 1931

Primary Carcinoma of Duodenum. G. Pacetto.—p. 845.
Aseptic Operative Method: Possibility of Contamination from Drainage Established for Prophylactic Purposes in Surgical Interventions. M. Romeo.—p. 881.
Morphology of Transplanted Placental Elements. G. Perrotti.—p. 887.
*Injections of Calcium Salts into Tissues Adjacent to Fractures. S. Rollo.—p. 901.
*Hepatic Hemostasis. P. Barco.—p. 913.
*Morphologic Modifications of the Blood, and Behavior of Immunizing Processes with Relation to Periarterial Sympathectomy. F. Benso.—p. 951.
Colibacillary Epididymitis. G. Calissano.—p. 962.
Supernumerary Pancreas. I. Barcaroli.—p. 969.
Surgical Edemas. O. Amorosi.—p. 979.

Injections of Calcium Salts into Tissues Adjacent to Fractures.—Rollo injected aqueous suspensions of calcium glycerophosphate into the tissues immediately adjacent to fractures, in dogs and in rabbits, and then studied roentgenologically and histologically the behavior of the callus about the fragments of bone, from the fifteenth to the thirtieth day. He found always early ossification of the callus and the appearance of calcifications in the regions adjacent to the bones. These results have to do with applications under physiologic conditions. Further experiments will show whether in pathologic conditions worth-while benefits can be realized.

Hepatic Hemostasis.—Barco established experimentally that, at the present time, hepatic hemostasis is best attained by the following methods: autoplastic muscle graft, heteroplastic muscle graft and coagulation by means of the electrical knife. Each of the three methods compared with the other two has its advantages and its disadvantages. The autoplastic muscle graft does not always have a prompt and sure hemostatic action, although, on the other hand, the fibers gradually degenerate and the resulting reaction in the connective tissue is not intense; hence a linear scar of less extent is formed. The heteroplastic muscle graft, however, effects a prompt and enduring hemostasis, but the graft degenerates soon and the reaction in the connective tissue is intense, so that a cicatricial tissue results which is at least four times as large as that resulting from the use of the autoplastic graft. Such grafts must, of course, be used in perfectly aseptic fields. By the use of the electrical knife, followed by suturing of the cauterized surfaces to eliminate possible secondary hemorrhages, immediate hemostasis is effected, though the necrosis of the tissues is intense and is also remotely in evidence. The intense reaction on the connective tissue that results is the cause of an extensive cicatrix.

Morphologic Modifications of the Blood with Relation to Periarterial Sympathectomy.—Benso concludes from his experiments on persons sympathectomized that the increase of erythrocytes is not always present and when found is always slight. The quantitative changes in the erythrocytes do not run *pari passu* in the sound limb and in the diseased limb. The increase of leukocytes is not a constant factor, and when it occurs it is slight. It is more frequent in the diseased limb than in the sound limb. More frequent than the increase of leukocytes is the increase of neutrophils, although that too is within modest limits. The increase of neutrophils is more frequent in the diseased limb than in the sound limb. Bactericidal potency was always absent in the author's experiments except in one case, in which it was slight. Finally, the phagocytic potency of the blood was sometimes slightly increased after sympathectomy, there being a correspondence between the sound limb and the diseased limb.

Clinica Chirurgica, Milan

34: 585-692 (June) 1931

Mechanical Occlusions of Intestine in Appendicitis. G. Nogara.—p. 585.
Pathogenic Action of Certain Abnormal Ligaments Between the Gallbladder and the Colon. C. Chianello.—p. 616.
Primary Tuberculosis of Mammary Gland in Women. C. Cavina.—p. 626.
Researches on Variations of Azotemia, Alkali Reserve and Sodium Chloride in Experimental Intestinal Occlusion. F. Pagliani.—p. 645.

Giornale di Clinica Medica, Parma

12: 785-866 (Aug. 10) 1931

*Prognosis of Serous Pleuritis in Child. M. Cotellessa.—p. 785.
Peritoneal Carcinosis Due to Primary Gelatinous Cancer of Vermiform Appendix. A. Fontana.—p. 809.
Action of Ultraviolet Rays on Glutathione Content of Blood of Organs and of Skin. F. Vannucci and C. Negri.—p. 830.
Attacks of Convulsions in Relation to Intestinal Helminthiasis. A. Chierici.—p. 851.

Prognosis of Serous Pleuritis in Child.—Cotellessa concludes from his researches that serous pleuritis in the child is quite often, as is admitted by most authors, of a tuberculous nature and may lead later to a diffuse tuberculous process, the pleuritis being the first stage of diffusion of that process. The eventual evolution of the tuberculous process is associated with constitutional peculiarities, with heredity, with the opportunities for later contagion, or with other causal factors that have appeared independent of the treatment used. The treatment of types of serous pleuritis in the child, although it is firmly established that it is superfluous and possibly harmful to employ evacuation in forms with a slight exudate, does not

exclude evacuation treatment in cases with an adequate fluid effusion, with respiratory decompensation, and with pressure of the adjacent organs. Evacuation treatment has not resulted in the author's experience in harmful effects on the later course of the disease.

Policlinico, Rome

38: 325-396 (July 15) 1931. Surgical Section

Pancreatic Cysts: Case. F. Benso.—p. 325.
*Strawberry Gallbladder: Case. R. Grasso.—p. 335.
Microscopic Changes Produced by Electric Knife. G. Gucci.—p. 350.
One Hundred and Seventy Cases of Echinococcus Cyst. G. Petta.—p. 360.
Renal Functioning Studied with Indigo Carmine. A. Vitale.—p. 371.
Electrical Incision by Means of Diathermic Loop in Minor Surgical Interventions. V. Wucherpfennig.—p. 379.

Strawberry Gallbladder.—Grasso concludes from his clinical and anatomopathologic researches in a case of strawberry gallbladder, with simultaneous interstitial calculosis, that, in the pathogenesis of biliary lithiasis, importance must be attached to intramural calculosis, not only in the interstitial but also in the subendothelial form (strawberry gallbladder). The clinical syndrome is similar to that of calculosis of the gallbladder. Strawberry gallbladder is an anatomopathologic entity that is not of inflammatory origin but is a simple lipoidosis of that organ and is of a reversible nature.

Archiv für Gynäkologie, Berlin

146: 155-366 (Aug. 10) 1931

Changes in Liver Following Castration. O. Bokelmann, H. Dieckmann, C. Kaufmann and W. Scheringer.—p. 167.
Anatomicoclinical Studies on Ovarian Tumor Material of the Women's Clinic in Kiel. K. Tietze.—p. 197.
Phosphorus Content of Serum of Pregnant Women and of the New-Born. O. Timpe.—p. 232.
*Influence of Viosterol on Behavior of Calcium and Phosphorus Contents of Serum During Pregnancy and During Osteomalacia. O. Timpe.—p. 240.
*Experimental Modification of Iodine Metabolism by Corpus Luteum Hormone. W. Scheringer.—p. 248.
Significance of Six Phasic Microsedimentation Test for Gynecologic Problems. H. Eufinger.—p. 261.
*Autohemotherapy in Puerperal Fever. M. J. Litwak.—p. 273.
Tuberculosis and Pregnancy. A. Blisnjanskaja.—p. 302.
Time of Conception Capacity of Women. H. Knaus.—p. 343.
Blood Vessels on Surface of Myomas. W. Mestitz.—p. 358.

Changes in Liver Following Castration.—Bokelmann and his associates point out that obesity, no matter which form, is always due to a disproportion between the ingestion of food and the food requirements of the organism. Considered from this point of view, obesity is a metabolic disturbance and the condition of the liver, as the central organ of metabolism, deserves especial consideration. The authors investigated two problems: (1) the total glycogen and fat contents of the liver in genital obesity; (2) whether this form of obesity can be influenced by the administration of ovarian hormones. The tests were made on albino rats. The livers of the castrated female rats showed considerable changes in the chemical composition, in that the absolute and the relative glycogen contents were increased, while the relative content in fat was decreased. The postcastration increase in weight and the glycogen concentration in the liver showed a certain parallelism. The weight of castrated albino rats that were treated with the follicle hormone inducing estrus increased likewise. Accordingly it cannot be decided whether the removal of the ovaries has a specific influence on the carbohydrate-fat metabolism or whether the castration checks the combustion processes in general; at any rate the liver in genital obesity is characterized by a high glycogen content and by deficiency in fat. This condition is the exact opposite of the fatty liver that develops in the artificially overnourished organisms of fattened animals. Investigations on the glycogen and fat contents of the liver during the various phases of the sexual cycle were made on seventy albino rats. The quantitative differences were negligible, but the number of tests is still too small to permit a final statement. Histochemical estimation indicates a relatively low glycogen concentration of the liver during the proestrum and estrum, whereas during the metestrum and diestrum the opposite is observed.

Influence of Viosterol on Calcium and Phosphorus Contents of Serum During Pregnancy and Osteomalacia.—Timpe found that not in all but in a considerable number of the examined cases viosterol exerted an influence on the calcium and phosphorus contents of the serum of pregnant women. This influence became manifest in an increase of the total calcium content and of its dialyzable portion and in a reduction of that portion of phosphorus that is insoluble in acid. In nonpregnant women with osteomalacia the administration of viosterol effected cure. The organic phosphorus content of these patients was influenced in the same manner as that of the healthy pregnant women.

Experimental Modification of Iodine Metabolism by Corpus Luteum Hormone.—Scheringer studied the action of the ovarian hormones, especially of corpus luteum hormones, on the thyroid in women with normal menstruation. In eight of the women the corpus luteum hormone was administered during the intermenstrual period and in five during the premenstrual period. The reactions were about the same in the two groups in that parenteral administration of one ampule of corpus luteum hormone effected a marked increase in the iodine concentration of the blood, and an increase, although somewhat less regular in the elimination of iodine in the urine. These changes were especially noticeable when the hormone had been given on two successive days. Tests with the follicle hormone revealed that small doses of this hormone did not have the same influence on the iodine concentration of the blood and urine as the corpus luteum hormone did, but larger doses of the follicle hormone had an effect like that of the corpus luteum hormone. However, the tests with the follicle hormone were made on a small number of women and consequently the author does not feel justified in drawing final conclusions. The preparations that were employed for the experiments were found practically free from iodine, and control solutions were found to have no influence on the iodine content. On the basis of his observations the author concludes that administration of "ovarian" hormone increased the functioning of the thyroid.

Autohemotherapy in Puerperal Fever.—Litwak reviews the literature and reports his own experiences on the efficacy of autohemotherapy in puerperal fever. In discussing the technic of the treatment he states that from 5 to 10 cc. of blood was withdrawn from the cubital vein and was injected into the gluteal muscle. In cases in which it was possible to begin the autohemotherapy early, 10 cc. was administered in the first injection, and in the subsequent treatments the quantity was gradually reduced; however, in a patient in whom the disease was at a more advanced stage, not more than 5 cc. was given at the first injection and after that the amount was increased by 1 cc. at each subsequent treatment. In regard to the intervals between the treatments the author states that he has found the one day interval to be the most advantageous. Further, the mechanism of autohemotherapy is discussed and case histories are given. A tabular report indicates the various puerperal septic diseases in which autohemotherapy was employed. It was found that autohemotherapy had not the same efficacy in the different puerperal disorders. The milder forms of endometritis and lochiometra usually did not require treatment; the more severe cases improved under the influence of autohemotherapy. In puerperal ulcers and in mastitis autohemotherapy proved likewise of great value, only ten out of thirty-three patients with mastitis required surgical treatment. In spite of the fact that many authorities consider autohemotherapy as contraindicated in pyelitis, the author obtained favorable results with it. Pelviperitonitis and parametritis likewise yielded to autohemotherapy. In cases of thrombophlebitis of the pelvis and of the lower extremities, autohemotherapy was employed; however, the author thinks that in the majority of these cases it is not necessary, and that immobilization of the extremities and good care are sufficient. Pyosalpinx proved least influenceable in that most of the patients had to remain in bed for several months; however, there was no fatality from pyosalpinx. In peritonitis and in generalized infection with metastases, autohemotherapy proved to be of great value. It counteracted the pain, and that it stimulated the myeloid and the reticulo-endothelial system could be observed on the hemograms. However, the author does not wish to give the impression that autohemotherapy is a specific remedy in such cases. He deplores that in cases of peritonitis

and of generalized infection the patients are often brought for treatment when it is already too late. However, in the beginning stage of puerperal septic disturbances autohemotherapy is of great therapeutic value.

Beiträge zur Klinik der Tuberkulose, Berlin

77: 641-804 (July 6) 1931

*Possibilities and Limitations of Thoracocauterization According to Jakobaeus' Method with Remarks on Maurer's Enucleation Operation. F. Pomplun.—p. 641.
*Value of Roentgenology and Thoracoscopy for Indications for Thoracocauterization. F. Pomplun.—p. 656.
Treatment of Pneumothorax Empyemas in Patients with Tuberculosis. Geismeyer.—p. 682.
Congenital Bronchiectasis and Cystic Lung. J. Herms and C. Mumme. —p. 701.
Influence of Nonspecific Factors in Tuberculin Reaction. H. Reichel and W. Milbradt.—p. 717.
Lipase Titer of Serum of Children with Tuberculosis. A. Gradnauer. —p. 725.
Pregnancy and Pulmonary Tuberculosis. A. Divoux.—p. 742.
*Roentgen Diagnosis of Tuberculosis of Larynx. A. M. Gelfon and N. A. Panow.—p. 795.

Possibilities and Limitations of Thoracocauterization.—In the first part of the article, Pomplun relates his experiences with the method of Jakobaeus. In 92 out of 465 artificial pneumothoraces it was considered necessary to resort to thoracocauterization in order to remove adhesions that prevented the complete collapse. Roentgenoscopy and thoracoscopy of these 92 patients revealed, however, that thoracocauterization was feasible in only 65 of them. In 49 of these, that is, in more than 75 per cent, the operation was a complete success, in 12 patients it was partially successful, in 3 patients the course of the disease was not influenced, in spite of the fact that the collapse had become more complete, and in 1 patient there was an exacerbation of the tuberculous process. Of the 65 patients who had undergone thoracocauterization, 55 were able to work again. The fact that from 70 to 80 per cent of the thoracocauterizations that are done according to the Jakobaeus method are completely successful shows that this procedure represents a considerable improvement in the induction of artificial pneumothorax. However, the method of Jakobaeus also has its limitations. Short adhesions, in which there is only a minimal distance between the lung and the wall of the thorax, also unusually thick adhesions, lung pedicles, and strands containing much blood cannot be removed with the aid of the cautery only and in cases of this nature Maurer's modification of the Jakobaeus method brings better results. Maurer's method is not a mere division of the strands but rather an "enucleation" of the thoracic adhesions by means of a combination of diathermy and the cautery. Maurer works, if possible, in the sterile layer of the endothoracic fascia, and serious complications such as hemorrhages and empyemas can thus be avoided. The author employed Maurer's procedure in 14 cases, and he thinks that this method has greatly enlarged the sphere of thoracocauterization, in that patients who formerly required thoracoplasty, or in whom pneumothorax treatment had to be discontinued, can now be treated by thoracocauterization and artificial pneumothorax. The technic of Maurer's combination method is comparatively difficult and requires long practice.

Value of Roentgenology and Thoracoscopy for Indications for Thoracocauterization.—Pomplun aims to show that in cases of partial pneumothorax the roentgenogram frequently does not give a clear picture of the number and size of adhesions. The surgeon is often surprised at the great differences between roentgenograms and the results of thoracoscopy. A comparison of the two shows that one has to be on guard against erroneous interpretation of the roentgenogram. The necessity for precaution becomes the more apparent if one considers that even the endoscopic examination shows the adhesions only from one side; namely, by way of direct optics. The thoracoscopic picture appears entirely different, however, when indirect optics is employed, when the adhesions are observed from the side and, as far as possible, also from the back. An apparently thin strand may suddenly be recognized as a thick adhesion and other difficulties may be encountered. In deciding on the advisability of thoracocauterization one should therefore never rely on the roentgenogram alone but should also resort to thoracoscopy by direct and indirect optics.

Roentgen Diagnosis of Tuberculosis of Larynx.—Gelfon and Panow show that roentgenoscopy represents a valuable diagnostic method in tuberculosis of the larynx. It shows the localization, the extent and the depth of the process. In connection with the clinical and laryngoscopic observations, the roentgenogram permits a differentiation of the various forms of the tuberculous processes; namely, the productive and the exudative forms. Laryngoscopy and roentgenoscopy complement and control each other, and together they give a clear picture of the laryngologic disease.

Klinische Wochenschrift, Berlin

10: 1521-1560 (Aug. 15) 1931

Physiologic and Pharmacologic Significance of Circulatory Active Products of Intermediate Metabolism. K. Zipf.—p. 1521.
Hydrogen Ion Concentration of Feces and Its Significance for Acid-Base Equilibrium. W. Löffler and M. Kartagener.—p. 1524.
Modification of Chronic Nephropathies by Intercurrent Infectious Diseases. Berta Aschner.—p. 1525.
*Copper Content of Human Milk and of Cow's Milk. S. G. Zondek and M. Bandmann.—p. 1528.
Clinical Investigations on Action of Extracts from Heart and from Skeletal Muscles in Circulatory Disorders. W. Ludwig.—p. 1531.
Significance of Deciduous Teeth for Child's Organism. K. F. Hoffmann. —p. 1534.
Body Weight During and After Fresh Air Treatment of Undernourished Children with Inactive Tuberculosis. W. Kornfeld.—p. 1535.
Simply Prepared and Reliable Gold-Sol: Useful Dry Complement. H. Hoess.—p. 1538.
Value of Kahn's Flocculation Reaction in Comparison with Reactions of Wassermann and Meinicke, Especially in Pregnant and Puerperal Women. Maria Rittau.—p. 1539.
Simplified and Improved Technic of Staining of Vital Granulated Erythrocytes with Remarks on Counting Method. R. Wolfer.—p. 1541.
Alleged Nonpoisonousness of Ergosterol Preparations Irradiated with Filtered Rays. T. Reiter.—p. 1542.
Idem. F. Laquer.—p. 1542.
Hormones of Generative Gland and Growth of Blastoma. B. E. Brüda. —p. 1543.
Prevention of Photodynamic Manifestations by Neoarsphenamine. S. Rothman.—p. 1544.
Arsenic Exanthems in Acute and Chronic Arsenic Poisoning. K. Ullmann.—p. 1544.

Copper Content of Human Milk and of Cow's Milk.—In their introduction, Zondek and Bandmann point out that researches in recent years have proved the biologic significance of certain metals, including copper. Steenbock and his associates observed that when young rats were fed for a long period with only cow's milk they developed deficiency symptoms that could be counteracted only by administration of copper salts. In order to determine whether the copper deficiency of cow's milk may have an injurious influence on the human infant, Zondek and Bandmann compared the copper content of human milk and of cow's milk. The results of their investigations are summed up as follows: 1. The copper content of human milk is about three times as great as that of cow's milk. 2. The mixtures of cow's milk (diluted cow's milk with addition of certain substances) likewise have a deficient copper content, differing only slightly from that of pure cow's milk. 3. The difference in the copper content of cow's milk and of human milk is about 0.4 mg. per liter. 4. Because of the great biologic significance of copper, especially for the growing organism, prophylactic administration of copper seems advisable for artificially fed infants.

Kazansky Meditsinsky Jurnal, Kazan

27: 555-704 (June) 1931

*Diagnostic Value of Skin Reaction to Foreign Serum. A. F. Agafonova. —p. 574.
Syphilitic Aortitis. L. I. Vilenskiy and L. M. Rachlin.—p. 579.
Pulmonary Hyperemia. M. Mastbaum and M. Vinnikov.—p. 584.
Surgery in Chronic Pleural Empyema. Y. A. Ratner.—p. 605.
Electrotherapy in Gynecology. L. G. Sobolev.—p. 613.
*Metrosalpingography. D. Goldstein and S. Leybov.—p. 616.
Roentgenologic Methods in the Intestine. R. Y. Gasul and M. J. Goldstein.—p. 630.
Malarial Dermatitis. Y. D. Pechnikov.—p. 635.
Sodium Thiosulphate in Dermatology. A. M. Leyzerovsky.—p. 638.
Brilliant Green in Treatment of Blepharitis. I. I. Ratner.—p. 642.

Diagnostic Value of Skin Reaction to Foreign Serum.—Agafonova, using the Prausnitz-Küstner method in many animal and human experiments, concludes that skin tests with foreign serum are valuable as a diagnostic aid in serum sickness. A strongly positive skin reaction to serum indicates a

hypersensitiveness of the patient. Therapeutic serum in positive cases should be used carefully and then in fractional doses. Sensitization to foreign serum is more often brought about through the intracutaneous route than through any other (intramuscular) route.

Metrosalpingography.—Since 1928, Goldstein and Leybov have included in their study sixty-one patients and have taken 142 roentgenograms. In the majority of cases 20 cent iodized sesame oil was the opaque medium; however, when the results were not clear, the test was repeated with iodized poppy-seed oil. Their observations lead them to conclude that: Metrosalpingography has proved to be a valuable method for anatomic and physiologic study in the diagnosis of female diseases of the uterus and the oviducts, demonstration of details in rare anomalies of the uterus, peristalsis of the fallopian tubes, and early pregnancy. To localize spasm of the oviducts, the dosage of opaque medium should at first be small; namely, 2 or 2.5 cc. Roentgenography is without equal in determining the indications for surgical intervention. Surgical intervention is recommended when the obstruction is in the abdominal extremity of the oviduct but is not advised when the obstruction is in the pars isthmica or pars interstitialis. Roengenography may supplement the Bordet-Gengou complement fixation test for gonorrhea and may aid therapeutic prognosis and control. Hospitalization of the patient is unnecessary; she may continue to perform the daily routine of duties. Metrosalpingography may in time prove a means of increasing the knowledge of the anatomy and physiology of the female genital system.

Nederlandsch Tijdschrift voor Geneeskunde, Haarlem

75: 4401-4508 (Aug. 29) 1931

Beriberi as Complication in Pregnancy and Childbirth. N. J. A. F. Boerma.—p. 4402.
Chloro-Anemia with Achylia Gastrica. F. S. P. van Buchem.—p. 4408.
Basal Metabolism in Fat Childrer.. M. de Bruin.—p. 4418.
*Treatment of Pernicious Anemia by the Intravenous Administration of Liver Extract. H. C. van Leeuwen.—p. 4425.
Torsion of Spermatic Cord. H. L. Coopman.—p. 4433.

Treatment of Pernicious Anemia.—Van Leeuwen reports the results secured from the intravenous administration of a special type of liver extract in five cases of pernicious anemia —some of them grave. In every case, in from two to four days after the first injection an increase in the number of reticulocytes was observed. After the injection of 30 cc. of the extract the author noted a considerable increase of the hemoglobin content and in the number of erythrocytes. No dangerous or even unpleasant by-effects are observed if the intravenous injections are given slowly—in some cases a total of nineteen injections. The influence on the general condition of the patients was very good. The author regards, therefore, this type of liver extract as a harmless remedy with a rapid action. Trials of intramuscular administration are being made. Thus far, a prompt reaction on the reticulocytes has been observed. In contrast with the intravenous administration, unpleasant by-effects were not noted, and the injections were painless.

Bibliotek for Læger, Copenhagen

123: 203-248 (May) 1931

*Kidney Functioning in Acute Nephritis. C. Holten.—p. 203.
Psychopathogenesis of Schizophrenia. O. Brüel.—p. 243.

Investigation of Kidney Functioning in Acute Nephritis.—Holten states that combination of the concentration test with a creatinine test gives the best information on the renal functioning. In the case of acute nephritis the function tests, particularly the creatinine tests, are of value in determining the completeness of the patient's recovery. In acute nephritis the combination of the creatinine test and the concentration test makes topical diagnosis possible to a certain degree.

123: 297-359 (July) 1931

*Treatment of Femoral Hernia. E. Husted.—p. 297.

Treatment of Femoral Hernia.—In Husted's 1,688 cases of femoral hernia treated surgically, the postoperative mortality was between 1.5 and 2 per cent, mainly from pulmonary complications and emboli in the pulmonary artery. The procedures employed were simple herniotomy with and without suture of the hernial ring, suture of Poupart's ligament to fascia, muscle or periosteum, inguinal methods, and plastic methods with the use of fascia or muscle. The immediate results, with one exception, were good in all cases. After-examination more than one year after treatment in 667 cases showed recurrence in 20 per cent, the permanent results being affected particularly by suppuration and the use of débridement. There was recurrence in only 6.5 per cent after the inguinal methods and in only 15 per cent after suture of the ligament to the exposed pectineus muscle. In the treatment of the hernial sac, high extirpation seemed to be important. In about 4 per cent of the cases inguinal hernia appeared later, without marked difference between the various operative methods used.

Hospitalstidende, Copenhagen

74: 685-712 (June 18) 1931

*"Malacia" of Semilunar Bone: Forty Cases. Conc'n. L. Ø. Christensen —p. 685.
*Osteochondritis Dissecans of Head of Radius. A. Nielsen.—p. 701.
Glyoxylase: Coenzyme Concentration in Live Tissue in Inanition. P. Vogt-Møller.—p. 706.
Nystagmus with Myoclonia in Twins. P. Levinson.—p. 708.

"Malacia" of Semilunar Bone.—Christensen does not find decisive evidence against the conception of malacia of the semilunar bone as the result of fracture. He states that the disorder is incurable and the changes which have once occurred are likely to increase, particularly with development of arthritis deformans. Complete functional restitution is practically unknown but there is a marked tendency to spontaneous improvement after the first acute stage. Treatment should be conservative, at all events the first year or two. The author questions whether operative treatment is ever indicated.

Osteochondritis Dissecans of Head of Radius.—Nielsen describes three typical cases in the right elbow in young men in whom the condition originated without actual trauma and ran a chronic course. Roentgenologically and on operation it was found that with the forearm supinated the osteochondritis in all cases was in that part of the margin of the head which turned toward the ulna. The loosened piece of bone and cartilage and its surroundings had the same appearance as a recent osteochondritis deformans in the head of the humerus or condyle of the femur.

74: 713-724 (June 25) 1931

*Chronic Ileocolic Invagination. P. Freudenthal.—p. 715.

Chronic Ileocolic Invagination.—In Freudenthal's first case in a girl, aged 16, with pain in the right side of the abdomen for several weeks, operation revealed an ileocecocolic invagination with changes in the cecum and ascending colon indicating that the invagination had existed for a long time. In the second case, in a girl aged 4, with onset of symptoms of a week before operation, he found an ileocecocolic intussusception probably of several days' duration, together with considerable hypertrophy of the anterior taenia of the cecum and ascending colon. In both cases there was a cecum mobile and a common mesentery.

Hygiea, Stockholm

93: 481-528 (July 15) 1931

*Development of Syphilis in Light of Histology. J. Almquist.—p. 481.
Operative Treatment of Exophthalmic Goiter. G. Petrén.—p. 490.
Liver Rhythm and Daily Variations of Blood Sugar. E. Forsgren.—p. 501.
Daily Variations of Blood Sugar. J. Möllerström.—p. 504.

Development of Syphilis in Light of Histology.—From his histologic examinations of various syphilitic changes, Almquist concludes that there are unlike characteristic changes in each of the different tissues, that these changes are in the main the same both in older and more recent stages of syphilis and allow no division into three periods, and that the different appearance of the various clinical syphilitic changes depends on the localization of Spirochaeta pallida in the tissues, also on variations in immunity, action of toxins and antitoxins, nutritive disturbances and other factors. He describes infiltrative and late degenerative changes and epithelial and endothelial proliferation, together with pustular and necrotic changes, and differentiates cutaneous syphilitic changes into six types. His incomplete investigations on syphilis of the inner organs and the nervous system point to changes analogous to the cutaneous changes, with the absence of pustule formation.